HAZARDOUS
SITE CONTROL
DIVISION

**Remedial Planning/ Field Investigation Team (REM/FIT)**

**ZONE II**

CONTRACT NO.
68-01-6692

CH2M HILL

Ecology & Environment

Draft Final

FOCUSED FEASIBILITY STUDY FOR SURFACE CLEANUP

WESTERN PROCESSING
KENT, WASHINGTON

EPA 37.0L16.2

June 4, 1984

# SUMMARY

This report presents the initial results of a focused feasibility study for cleanup of surface wastes from the Western Processing site in Kent, Washington. Cleanup of the surface materials is a remedial action authorized by the Environmental Protection Agency as part of the work needed to eliminate risks posed to the public by the onsite materials.

The purpose of the focused feasibility study is to prepare, by means of a thorough and systematic examination of alternative remedial measures, design and contract documents to allow cleanup of surface wastes during the summer of 1984. Removal of the surface materials will help prepare the site for additional surface water drainage control measures and subsurface remedial actions. This report identifies the various types of wastes onsite, then develops and screens alternative methods for dealing with the wastes. A major objective was to find feasible and cost-effective disposal methods for each waste type by assessing all relevant and available technologies.

## MATERIALS IDENTIFICATION AND CLASSIFICATION

The materials identification and classification activities identified 28 classes of materials on the site. The activity grouped the wastes by their general characteristics and containerization. Volumes for the various wastes were estimated from previous information and a field reconnaissance done during the study. Major wastes at the site include:

- Gypsum pile (approximately 10,000 cubic yards)
- Tanked fluids (approximately 500,000 gallons)
- 2,000 drums full of liquids or sludges
- 400 containers of zinc oxide
- Approximately 4,000 used wooden pallets
- Approximately 3,000 cubic yards of flue dust
- Approximately 2,000 cubic yards of battery chips
- Approximately 2 acre-feet of ponded water
- 10 buildings

The storage of drums onsite varies from full drums stacked on pallets to empty drums stored randomly in piles. The condition of the drums ranges from structurally suitable for

transporting offsite to currently leaking. The tanks holding fluids and sludges have no current evidence of leakage, but the emergency response team, which performed temporary remedial measures in 1983, found that the tops of some tanks are unstable. The waste piles of battery chips and flue dust are uncovered, and the gypsum pile has a plastic cover top and bottom. Water has accumulated in the center of the site because of a naturally occurring low point in the site topography. Miscellaneous equipment is scattered throughout the site, and the buildings vary in structural integrity.

The disorder at the site, coupled with the limited amount of testing of the waste materials to date, leaves the possibility that the wastes identified might have other contaminants that could affect the selection of the appropriate remedial action. In addition, the operational practices of Western Processing apparently involved mixing different wastes to obtain a resultant product. Thus each waste onsite could be cross contaminated with other wastes. Each waste category selected was intended to be broad enough that any yet unknown waste still to be identified could fit into one of the selected categories.

## DEVELOPMENT OF REMEDIAL ALTERNATIVES

Remedial action alternatives were developed on a waste-by-waste basis. This was necessary due to the varying waste character, quantities, and storage containers. The alternatives were developed by specialists experienced in handling the various wastes. The alternatives were selected for evaluation if they were judged to apply to the waste types identified at Western Processing, could be used cost effectively with the volume of each waste currently onsite, and were a proven technology. The types of alternatives that meet these criteria are:

- Onsite treatment
- Hazardous waste landfill disposal
- Offsite treatment
- Nonhazardous waste landfill disposal
- Discharge to Metro
- Discharge to Mill Creek
- Incineration
- Recycle/Reuse
- Detonation
- Containment
- Release to responsible parties
- Return to manufacturer
- No action

The alternatives for each waste type are listed in Table 4-2.

EVALUATION OF ALTERNATIVES

Because of the technical complexity of the remedial alternatives, each alternative and its associated technologies were evaluated. Extensive contacts were made with representative industries and treatment, recycling, and disposal facilities that might be interested in the materials at the site. Such facilities include drum recyclers, boilers to burn the flammable fluids as fuel, reusers of treated zinc oxide as fertilizer for fruit trees, facilities with electric arc furnaces to remelt scrap steel, battery chip recyclers, and reusers of tires.

All of the persons contacted asked for more detailed analysis of the wastes, and the types of analyses varied for each potential use. Other constraints were also determined from the contacts. Examples of constraints on each remedial alternative include:

- Onsite treatment
  - Existing waste characterization may not be sufficient to determine the feasibility of the alternative.
  - Waste consistency may affect use of the technology.
- Offsite treatment
  - Contaminants present are unacceptable for offsite treatment.
  - Treatment facilities may not have storage capacity to handle the amount of drums and bulk liquids for processing within the time limits of surface cleanup activities.
- Nonhazardous waste landfills
  - Landfills may not accept wastes for disposal.
- Hazardous waste landfills
  - Permit requirements may limit the waste type and quantity that the landfill can accept.
- Discharge to Metro
  - Discharge may be limited by parameters set in draft discharge permit.
- Discharge to Mill Creek

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- Low flow of Mill Creek will limit the amount of discharge.

o Incineration

- Contaminants could affect the process of the unit using the waste as fuel.

o Recycle/Reuse

- No recyclers contacted expressed interest in handling, processing, or reusing materials that are contaminated with hazardous materials.

- Testing would be required to determine that contaminants are not present.

- Recyclers did not want any future liability from taking waste.

- Recyclers wanted indemnification from EPA against any losses from taking the waste.

In general, finding users for the materials onsite would involve extensive sampling and analysis to prove that the wastes are not hazardous according to Washington Department of Ecology dangerous waste regulations and EPA hazardous waste regulations.

ALTERNATIVES SCREENING

The objective of the screening task was to determine the alternatives with the greatest feasibility of application at Western Processing. The screening process was done in two steps. The first step used qualitative engineering, economic, environmental, and institutional evaluation factors to eliminate less feasible remedial actions. The engineering considerations included technical feasibility, demonstrated application and reliability, consistency with project needs, safety, schedule, and logistics. An economic analysis was done on an approximate-cost basis and included capital, operating and maintenance, and total costs. The environmental considerations included short- and long-term environmental impacts and public health effects. The institutional factors consisted of permit requirements, contract negotiation, and risk potential.

The second level of screening considered costs in a more quantitative manner through the use of order-of-magnitude costs. These costs were weighed against the potential value of recycling and reuse (as fuels) versus the cost of sampling and classifying the wastes enough to determine their value. Schedule was also a screening criterion. Disposal of the materials as hazardous waste was the baseline against which all alternative actions were measured. The results of this screening reduced the number of alternatives to 2 or 3 per waste (See Table 6-2).

CONCLUSIONS

The waste types and associated remedial alternatives for disposal are limited by the current level of knowledge about the waste constituents. The alternatives identified upon completion of screening will be analyzed in greater detail in a forthcoming memorandum titled Detailed Analysis/ Conceptual Design. As more laboratory data become available on the wastes at Western Processing, the alternatives for evaluation may change to incorporate the new information.

TABLES

## LIST OF ACRONYMS

| | |
|---|---|
| ACGIH | American Conference of Governmental Industrial Hygienists |
| CAA | Clean Air Act |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (PL 96-510) |
| EP | Extraction Procedure |
| EPA | U.S. Environmental Protection Agency |
| ERT | Emergency Response Team |
| ESP | Electrostatic Precipitator |
| FFS | Focused Feasibility Study |
| FRP | Fiberglass Reinforced Plastic |
| FS | Feasibility Study |
| HNU | HNU Systems, Inc. |
| IPA | Isopropyl Alcohol |
| IRM | Initial Remedial Measure |
| ISS | Interim Status Standards |
| Metro | Municipality of Metropolitan Seattle |
| NIOSH | National Institute of Occupational Safety and Health |
| NCP | National Oil and Hazardous Substances Pollution Contingency Plan |
| NPDES | National Pollutant Discharge Elimination System |
| O&M | Operating and Maintenance |
| OSHA | Occupational Safety and Health Administration |
| PAH | Polycyclic Aromatic Hydrocarbons |
| PCB | Polychlorinated Biphenyl |
| RCRA | Resource Conservation and Recovery Act of 1978 (PL 94-580) |
| RI | Remedial Investigation |
| RI/FS | Remedial Investigation/Feasibility Study |
| TSCA | Toxic Substances Control Act |
| TSD | Treatment, Storage, and Disposal Facility |
| TWA | Time-Weighted Average |
| WAC | Washington Administrative Code |
| WDOE | Washington State Department of Ecology |

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FIGURES

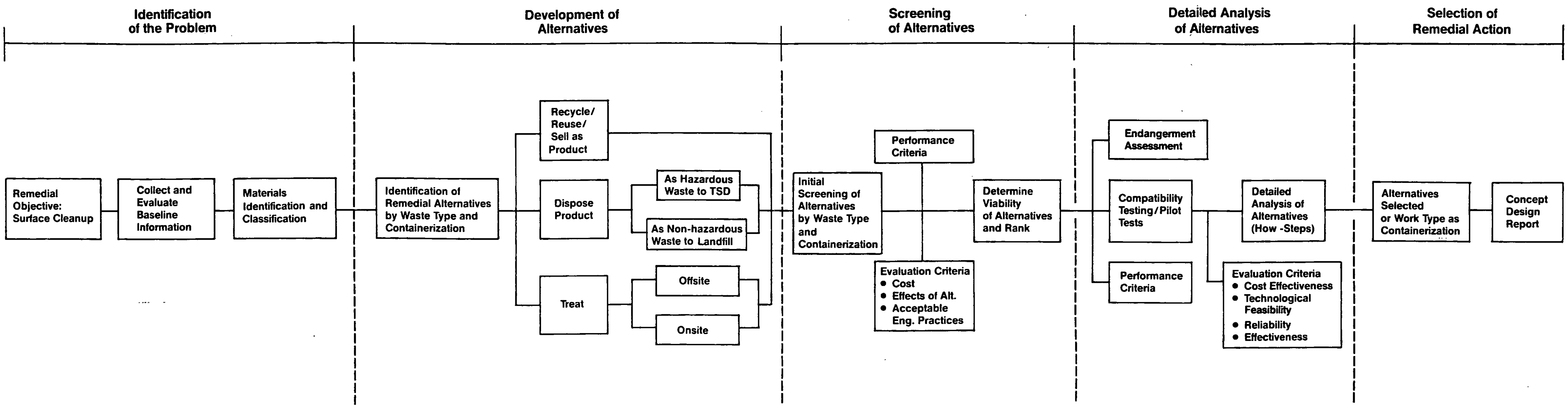


Figure 1—1
FOCUSED FEASIBILITY STUDY WORK FLOW

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## Section 3
## MATERIALS IDENTIFICATION AND CLASSIFICATION

The purposes of this task were to identify and classify the materials remaining onsite in order to provide a basis for development of remedial alternatives. The CH2M HILL team that performed this task used data on the materials remaining onsite after the completion of all previous EPA activities. The team also used available data from the ongoing remedial investigation. Information from the emergency response team was organized by RCRA categories whenever chemical information was available.

Inventory data available at the time of this writing were compared with the removal data from the emergency response actions of 1983 to determine the materials remaining on the site. To obtain additional insight into the character of some of the materials remaining on the site, an attempt was made to match potential responsible parties with the remaining wastes. The results of this activity are limited because of the lack of complete records maintained by the site owner.

### SITE CONDITIONS

Numerous changes have been made to the Western Processing site since the processing facility opened in 1961. Historical aerial photographic records of the site show some of the changes that have occurred over the period of operation (Figures 3-1 through 3-4). Since the facility was closed in April 1983, other agencies and cleanup contractors have worked on the site to assist in the cleanup efforts. The current locations of tanks and waste materials onsite are shown in Figure 3-5.

The center of the site (a natural low point) is currently covered by up to 2 feet of ponded water. An isolation berm was installed as a result of surface water control measures conducted in the fall to reduce the chance that this surface water might drain into Mill Creek. Activities are underway to remove the water. It is currently hampering the materials inventory task and will be an impediment to surface cleanup activities.

### WASTE ANALYSIS

During the emergency cleanup activities in 1983, the majority of drums and tanks were sampled and subjected to limited analysis by EPA contractors. The drums were sampled with field equipment to the level of detail sufficient for determining gross compatibility among materials. It was decided at that time that combining compatible wastes would

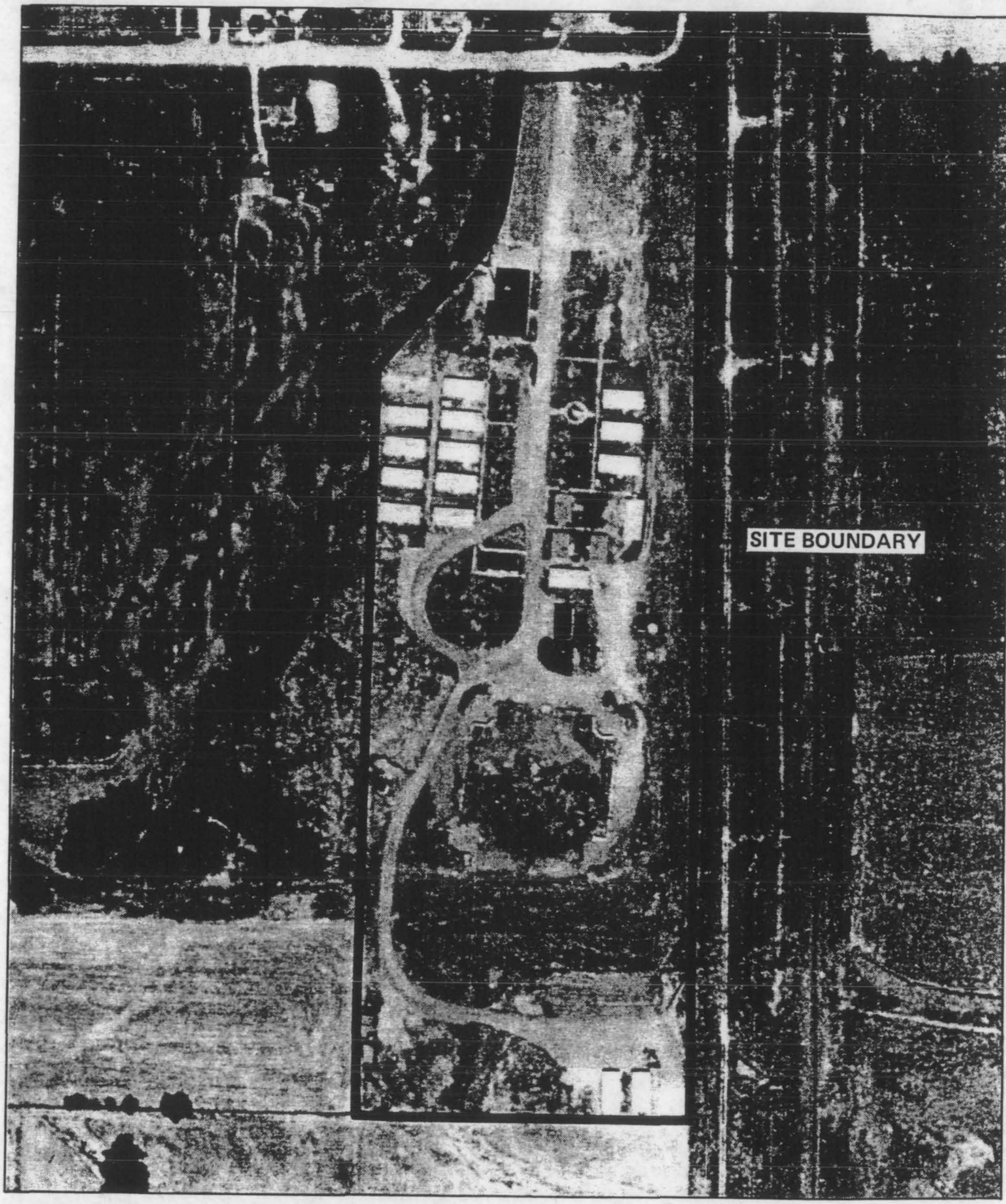


Figure 3–1
NIKE MISSILE FACILITY AT WESTERN PROCESSING SITE, JUNE 1960



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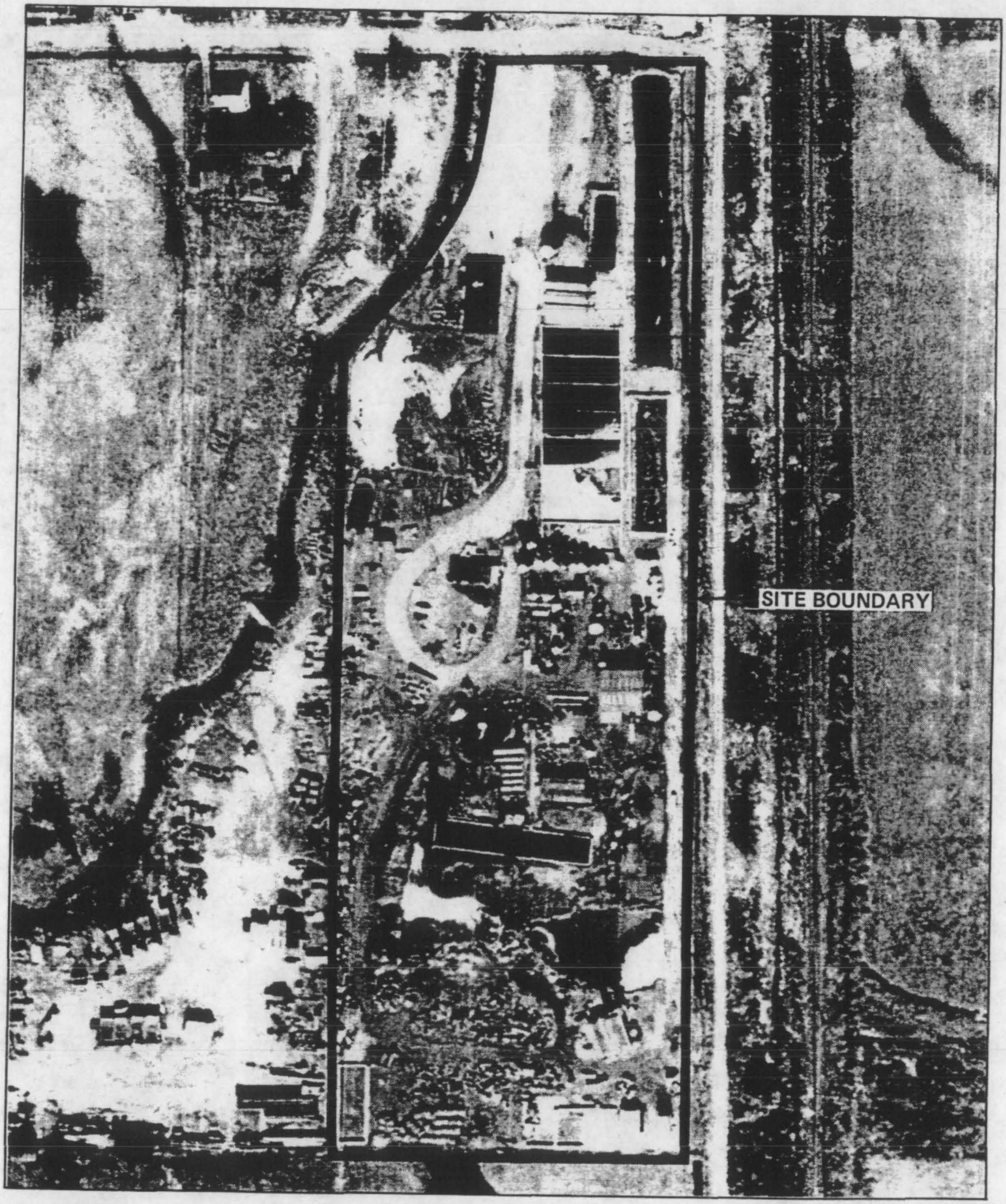


Figure 3–2
WESTERN PROCESSING
IN OPERATION,
MARCH 1974



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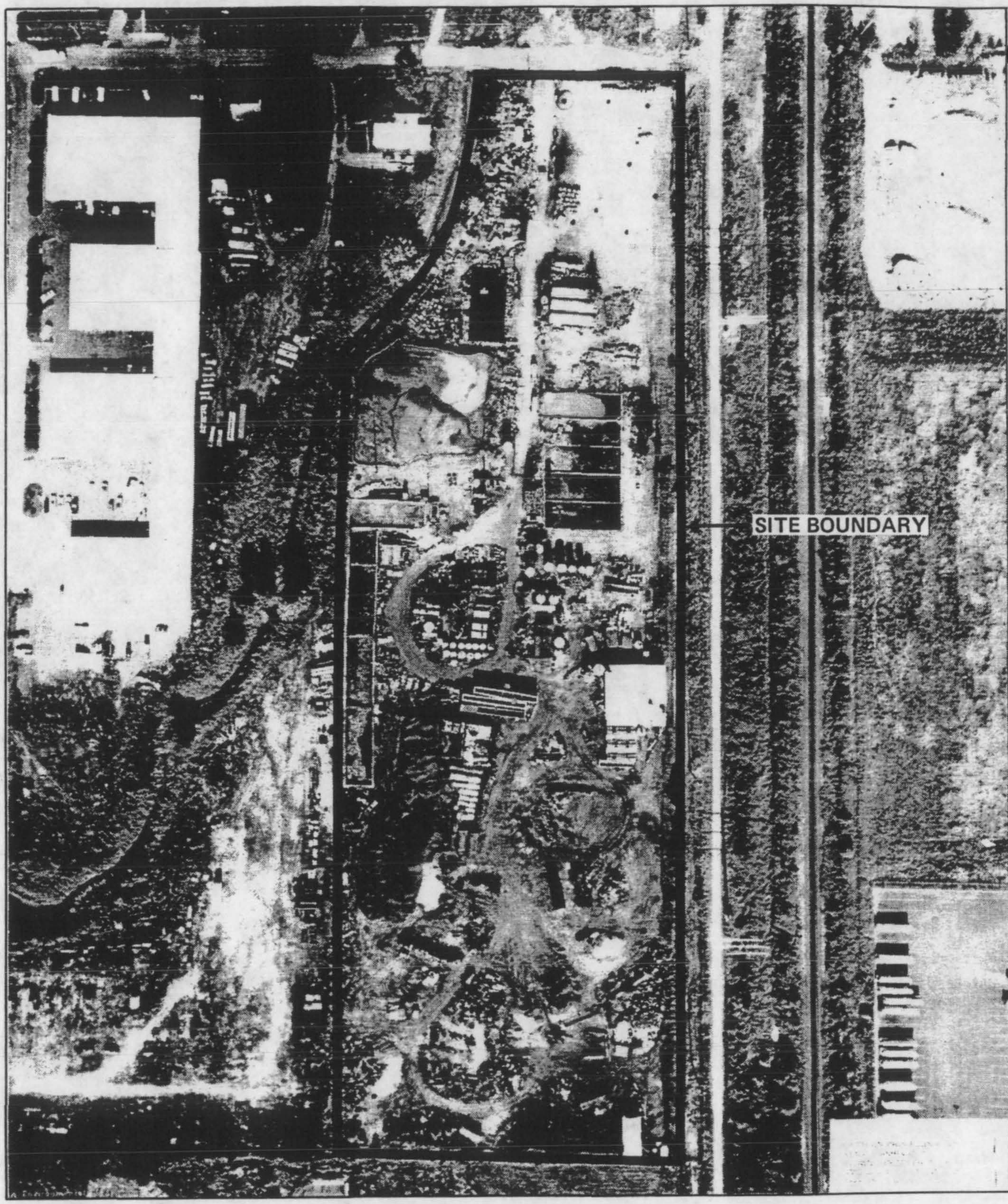


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Figure 3–3
WESTERN PROCESSING
IN OPERATION,
OCTOBER 1982

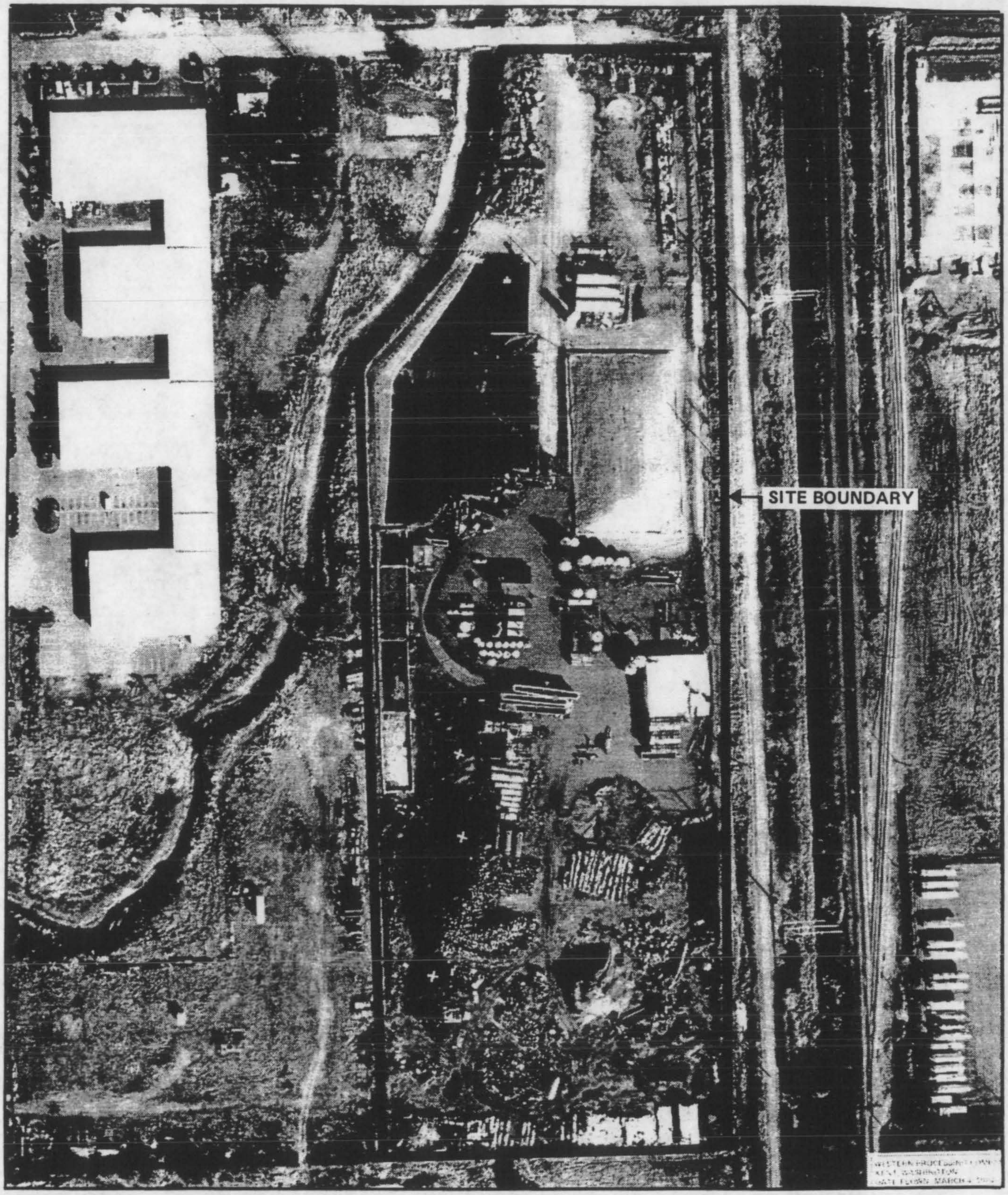


Figure 3–4
WESTERN PROCESSING
AFTER CLOSURE,
MARCH 1984



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provide a cost-effective means to remove materials from the site. Not all the waste categories were considered for compositing. Organic vapor and radiation tests were conducted directly on the drums using monitoring devices.

The following is a list of tests conducted and methods of testing applied:

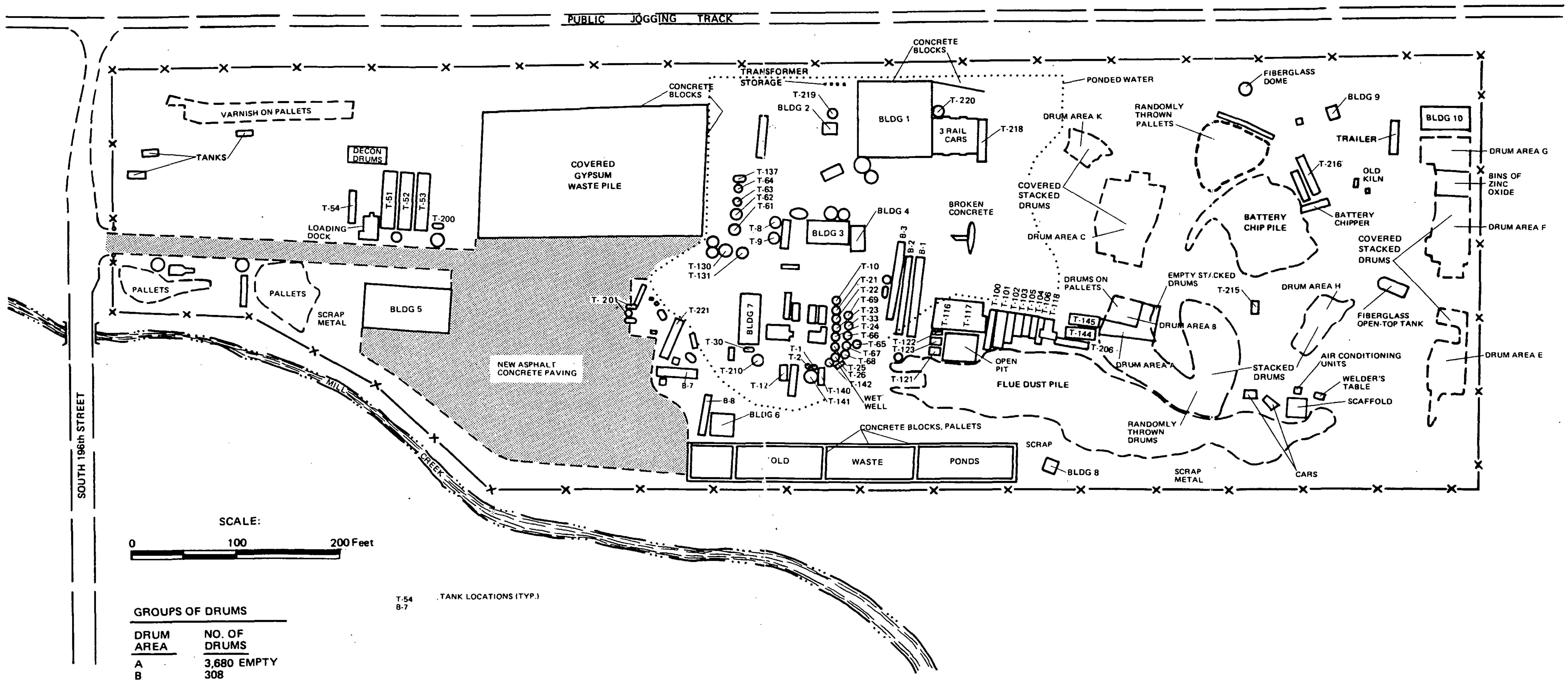
- o Water reactivity--added water to waste and monitored temperature
- o Flammability--applied flame to waste
- o pH--used pH test paper
- o Oxidization potential--used a portable ORP meter
- o Organic vapor concentration--used an HNU organic vapor detector
- o PCB--used equipment available in EPA mobile laboratory
- o Methylene chloride--used equipment available in EPA mobile laboratory
- o Radiation--used a radiation meter

The drums were characterized, coded with paint, and stationed throughout the site on pallets by the following categories:

- o Corrosive acids
- o Corrosive bases
- o Solids
- o Corrosive oxidizers
- o Noncorrosive oxidizers
- o Flammables
- o Water reactives
- o Nonhazardous
- o PCB's

These classifications allowed drums to be segregated for transportation. Through these testing methods, the emergency response team determined that materials in many drums could not be the products identified by the labels on the drums. Appendix A provides the only RCRA hazard classification codes available for the drums analyzed and remaining onsite. No toxicity tests were conducted on the waste by the emergency response team.

Over the winter, these codings have partially or completely disappeared, some drums have been situated with the codes not visible unless the drums are lifted and turned. Surface water and general safety conditions onsite inhibit moving




## GROUPS OF DRUMS

| DRUM AREA | NO. OF DRUMS |
|---|---|
| A | 3,680 EMPTY |
| B | 308 |
| C | 737 |
| E | 300 |
| F | 146 |
| G | 273 |
| H | 306 |
| K | 106 |

SOURCE: CH2M HILL RECONNAISSANCE, MAY, 1984

**Figure 3–5**
**LOCATIONS OF WASTE MATERIALS, MAY 1984**

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most of the drums at this time. In addition, the structural condition of the drums varies, and any movement could cause spilling or breaking. Movement of the drums to identify coding is anticipated to be conducted as part of site surface cleanup efforts during summer 1984.

Emergency cleanup contractors, interested parties, and the Washington DOE have also taken samples of waste onsite. When available, the results of these data are presented in this section.

IDENTIFIED WASTE MATERIALS

Table 3-1 lists and classifies the wastes identified to date and provides information on containerization. To date, 28 different waste categories have been found onsite. The major source of this listing is the emergency response team and verifications by the CH2M HILL site reconnaissance team. The emergency response team obtained some of its information from the facility owner.

The remedial investigation currently underway will attempt to verify the validity of this information and provide more detailed waste characterization. To date, the materials inventory portion of the remedial investigation has completed a photographic inventory and site reconnaissance. The photo inventory identified estimated volumes of bulk solid wastes onsite. The site reconnaissance identified estimated volumes of materials in drums, tanks, and miscellaneous other materials.

Current remedial investigation activities involve comparing drums and tanks identified as having been removed by the emergency response team with the drum numbers currently located onsite. The initial comparisons indicate that some drums identified as having been removed are actually still present.

Both the emergency response team and current remedial investigation activities have been used in conjunction with information obtained from other sources to provide the Table 3-1 estimate of waste materials onsite. These data are expected to change slightly upon completion of the materials inventory, which involves evaluation of site reconnaissance data and cursory sampling. In addition, any firms interested in removing site materials are being encouraged to take samples from the wastes to determine if the waste is acceptable.

This waste information has been collected from a number of sources, which in some cases contradict each other. The materials classification in this report provides the most recent and most likely waste types, volumes, containerization, and characterization.

# Table 3-1
## LIST OF WASTES PRESENT AT WESTERN PROCESSING SITE

| Waste Type | Solid/Liquid/ Sludge (S,L,SL) | Containerization | Current Estimated Quantity | Number of Items: Drums[f] | Tanks | Piles | Bins | Pallets | Tires | Transformers |
|---|---|---|---|---|---|---|---|---|---|---|
| A. Corrosive liquids | L | Drums,<br>Tanks/vats | 202,986 gal.[a] | 20 | 11 | | | | | |
| B. Sludge from corrosive tanks | SL | Tanks | 20,190 gal.[b] | | | | | | | |
| C. Isopropyl alcohol mixture | L<br>SL | Drums | NK[c] | NK | | | | | | |
| D. Flue dust | S | Bulk | 2,900 cu.yd.[d] | | | 1 | | | | |
| E. Battery chips | S | Bulk | 2,100 cu.yd.[d] | | | 1 | | | | |
| F. Zinc oxide | S | Drums<br>Bins<br>Tank | 129 tons[a] | 348 | 1 | | 60 | | | |
| G. Foaming agent | S<br>L<br>SL | Drums | 2,690 gal.[a] | 49 | | | | | | |
| H. Wood pallets | S | Bulk | 80 tons[a] | | | | | 4,000 | | |
| I. Printing inks, tars, oils and greases | L | Drums | 20,300 gal.[a] | 406 | | | | | | |
| J. Tires | S | Bulk | 1 ton[a] | | | | | | 63 | |
| K. Nail coating | L<br>SL<br>S | Drums | 3,000 gal.[e] | 60 | | | | | | |
| L. Unknowns | L<br>SL<br>S | Drums<br>Bulk<br>Tanks/Bins | NK<br>NK<br>NK | NK | <br><br>NK | | <br><br>NK | | | |
| M. Transformers | L | TX Casing | 5 to 10 tons[a] | | | | | | | 4 |

[a]CH2M HILL site reconnaissance, May 1984.

[b]Estimate based on existing data.

[c]Not known at this time.

[d]CH2M HILL photo inventory, May 1984.

[e]Emergency response team inventory, summer 1983.

[f]Drum count discrepancy can be resolved after each drum is tested to determine the appropriate waste category applicable.

## Table 3-1 (continued)

| Waste Type | Solid/Liquid/ Sludge (S,L,SL) | Containerization | Current Estimated Quantity | Number of Items | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Drums[f] | Tanks | Piles | Bins | Railcars | Boxes | Spray Cans | Crates | Blocks |
| N. "Synfuel" | L | Tanks | | | | | | | | | | |
| a. Bunker oil | | | 87,131 gal. | | 7 | | | | | | | |
| b. High arsenic content | | | 235,104 gal. | | 11 | | | | | | | |
| c. Mixed liquids | | | 53,476 gal. | | 10 | | | | | | | |
| d. Liquids with methylene chloride | | | 128,065 gal. | | 7 | | | | | | | |
| e. Caustic liquids | | | 7,899 gal. | | 1 | | | | | | | |
| f. Unknowns | | | 148,219 gal. | | 24 | | | | | | | |
| O. Gypsum pile | S<br>SL | Bulk | 10,128 cu.yd. | | | 1 | | | | | | |
| P. Fluids in gypsum pile | L | Bulk | NK | | | NK | | | | | | |
| Q. Sludge from bottom of tanks | SL | Tanks | 101,900 gal. | | | | | | | | | |
| R. Tanks and scrap steel | S | Bulk | | | | | | | | | | |
| S. Ponded water and decontamination water from operations | L | Bulk<br>Tanks | 1 million gal. | | | | | | | | | |
| T. Nonrecyclable solvents | L<br>SL | Drums<br>Tanks | 3,650 gal.[a] | 73 | NK | | | | | | | |
| U. Crystallized solids | S | Railcar | 56,720 cu.ft. | | | | | | | | | |
| V. Laboratory chemicals | S | Bottles<br>Jars<br>Cans | NK<br>NK<br>NK | | | | 3 | | | | | |
| W. Pesticides | S<br>L | Spray cans<br>Boxes | 5 to 7 tons | | | | | | | | | |
| X. Paint waste, varnishes, and stains | S<br>L<br>SL | Crates<br>Aerosol cans<br>Drums<br>Tanks | 30,000 to 50,000 gal. | 42 | 1 | 2 | | | 30-40 | 360 | | |
| Y. Flammable liquids | L<br>SL | Drums<br>Tanks | 10,000 gal. | 200 | | | | | | | | |
| Z. Concrete blocks | S | Blocks | 8,937 cu.ft. | | | | | | | | | 367 |

[a]CH2M HILL site reconnaissance, May 1984.

[b]Estimate based on existing data.

[c]Not known at this time.

[d]CH2M HILL photo inventory, May 1984.

[e]Emergency response team inventory, summer 1983.

[f]Drum count discrepancy can be resolved after each drum is tested to determine the appropriate waste category applicable.

Table 3-1 (continued)

| Waste Type | Solid/Liquid/ Sludge (S,L,SL) | Containerization | Current Estimated Quantity | Number of Items: Drums[f] | Tanks | Piles | Bins | Railcars | Boxes | Spray Cans | Crates | Blocks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AA. Demolition debris | S | Building | NK | | | | | | | | | |
| | | Supplies | NK | | | | | | | | | |
| | | Equipment | NK | | | | (see text for complete up-to-date list) | | | | | |
| BB. Empty drums | S | 55-gal. | 30,000 gal. | 6,000 | | | | | | | | |
| | | 50-gal. | | | | | | | | | | |
| | | 5-gal. | | | | | | | | | | |

[a] CH2M HILL site reconnaissance, May 1984.

[b] Estimate based on existing data.

[c] Not known at this time.

[d] CH2M HILL photo inventory, May 1984.

[e] Emergency response team inventory, summer 1983.

[f] Drum count discrepancy can be resolved after each drum is tested to determine the appropriate waste category applicable.

The major structures currently onsite are tanks, drums, buildings, and stockpiles. Generally, the current estimate of tanks onsite is 98. There are approximately 6,000 55-gallon drums onsite, of which approximately 4,000 are assumed to be empty. The drums are in varying conditions, although most appear unsuitable for reuse. There are 10 buildings onsite and three major stockpiles.

Discussions of each specific waste follow.

CORROSIVE LIQUIDS

Two major types of corrosive liquids present are drummed corrosives and corrosive wastewater in ten open-top tanks. During site reconnaissance activities, approximately 74 55-gallon plastic drums were found, of which approximately 54 appeared to be empty. The estimated volume remaining in the full drums is about 1,000 gallons. One type of corrosive identified in the drums is concentrated sulfuric acid. The majority of these drums are situated on the south-southwest portion of the site, south of the old waste piles (Drum Area A in Figure 3-5). Other miscellaneous drums with corrosives were identified in Areas H, K, and C. The presence of plastic drums is an indication that the contained material could be corrosive. The drummed corrosives have not been characterized beyond tests conducted during emergency cleanup activities.

The ten open-top tanks (B-1, B-2, B-3, B-6, B-7, B-8, T-216, T-217, T-218) previously contained corrosive liquids that had been been drained and disposed of offsite during emergency response activities. The sludges at the bottom of the tanks were not removed during those activities. Over the winter, the tanks have been accumulating rainwater that has come in contact with the sludges. This rainwater thus could be corrosive. The emergency response team identified T-137 as also containing corrosives. The capacity of each tank, assuming the worst case (full tank), is:

| Tank Number | Tank Capacity (gal.) | |
|---|---|---|
| B-1 | 55,711 | |
| B-2 | 40,931 | |
| B-3 | 40,931 | |
| B-6 | 11,519 | |
| B-7 | 9,425 | (identified as sludge) |
| B-8 | 6,567 | |
| T-137 | 6,882 | |
| T-216 | 10,472 | |
| T-217 | 10,472 | |
| T-218 | 8,976 | |
| TOTAL CAPACITY | 201,886 | |

No evaluation of the actual volume of the sludge material present in the tanks has yet been made, and the wastewater has not been characterized.

SLUDGE FROM CORROSIVE TANKS

The sludge previously identified in the corrosive tanks has not been analyzed, and the volume has not been determined. It can be assumed for purposes of discussion that 10 percent of the capacity of the tanks would be sludge. The volume of sludge based on previously described liquids could be about 20,190 gallons.

ISOPROPYL ALCOHOL MIXTURE

The emergency response team, through discussions with the site owner, determined that isopropyl alcohol is present in drums onsite. The isopropyl alcohol was apparently coded by the owner as IPA on the drums. These drums apparently contain 1 to 2 percent IPA, with the remaining contents identified as water. Attempts were made during the emergency cleanup efforts to find interested parties to recycle this material. Initially interested parties later declined acceptance of this material, and it was decided that the material was not salable. The volume and location of this material have not yet been identified. Additional characterization would be needed to determine if other contaminants are present in this waste.

FLUE DUST

Flue dust is located on the south-southwest portion of the site in a stockpile that has been estimated from photographs as having a volume of approximately 2,900 cubic yards. Site reconnaissance shows the flue dust to have the consistency of silty dirt. The dust is saturated with water starting approximately 2 inches below the surface, apparently from rainwater infiltration. The material sticks together and is slippery when wet. The flue dust is estimated to weigh approximately 2,200 tons.

The flue dust was used as a solidification agent with other materials onsite during the emergency cleanup. A sample of flue dust taken by the Washington Department of Ecology (WDOE) in April 1984 was found to be 25.3 percent liquid and 74.7 percent solids. (The location and depth of the sample was not identified, so the results might not be representative of the entire pile.) Normally, solidification processes result in a mixture containing 12 percent water. The existing water content could be reduced somewhat by use of automated solidification equipment. Therefore, if the sample were determined to be representative of the entire pile, the material would probably not be adequate for manual solidification purposes.

## Section 4
## DEVELOPMENT OF REMEDIAL ALTERNATIVES

This section describes the alternatives developed for cleaning up each of the 28 surface wastes described in Section 3. The available alternatives include various strategies such as beneficial reuse, disposal to landfills, and discharge of treated wastes to receiving waters or the atmosphere. Alternatives were developed in close consultation with the EPA and the WDOE. The evaluation and screening of these alternatives are described in subsequent sections.

### METHODOLOGY

Alternatives available to treat, recycle, or dispose of the wastes present at Western Processing were initially developed in a meeting of CH2M HILL specialists in all areas of hazardous waste management. For each of the 28 different waste types, remedial alternatives were identified during this meeting and each was evaluated for its applicability to that waste type. Specific alternatives would obviously be infeasible or unrealistic for a particular waste type (e.g., onsite incineration of corrosives). A table was generated for each waste type to show all the remedial alternatives that could conceivably be considered. These tables are presented in Appendix C.

After the initial meeting, the tables were reviewed extensively and in detail by appropriate engineering, economic, and envirionmental disciplines. The disciplines represented are listed in Table 4-1.

Table 4-1
STAFF DISCIPLINES INVOLVED IN DEVELOPMENT OF ALTERNATIVES

| | |
|---|---|
| Western Processing Site Project Manager; Water Resource and Hazardous Waste Engineer | Environmental Engineer |
| Remedial Investigation Task Leader; Hazardous Waste Specialist | Senior Chemical Engineer |
| Senior Chemist | Regional Superfund Project Team Leader |
| Chemical Process Engineer | Regional Office Manager |
| Air Pollution Specialist | Discipline Director, Solid and Hazardous Waste |
| Economics Specialist | Industrial Processes Division Manager |
| Regulatory Specialist | Industrial Reclamation Department Manager |

## RESULTS

The potential remedial alternatives that were identified are summarized in Table 4-2. The technology involved in each alternative is also presented. These technologies will be discussed further in Section 5 along with their potential application to the wastes identified at Western Processing.

The summary in Table 4-2 is based on the tables developed for each waste type. Listed in these appended tables are events that could eliminate the viability of each remedial alternative. These events, called "fatal flaws," fall into the following categories:

- Regulatory permit restrictions
- Insufficient analysis
- No interested parties for handling the waste
- Technology not available in the Northwest
- Potential presence of unexpected contaminants
- Not responsive to project needs
- Negative public perception
- Cost
- Inadequate temporary storage offsite

Also listed in the Appendix C tables are various comments concerning benefits, disadvantages, and considerations for each specific alternative. Typical considerations include:

- Extent of equipment needed to use the alternative
- Extent of sampling and analysis required to evaluate the viability of the alternative
- Degree of bench and pilot testing with the analysis data to determine if the alternative is practical
- Degree of repair needed to the onsite equipment to be used
- Expense of evaluating each consideration weighed against an alternative that would not need this information
- Transportation equipment needed
- Potential for not having practical use
- Need for solidification
- Need for regulatory approval

- Availability of interested parties in taking the waste

- Long- and short-term liability

Many other such items are presented in Appendix C.

LIMITATIONS

On the basis of the existing knowledge about onsite wastes, these alternatives should be sufficiently well defined to be applied to any new wastes not yet identified. Extensive effort was made to use the most accurate data currently available on wastes at Western Processing (Section 3). The waste information is continually being refined, and actual waste types, volumes, and containerization are not expected to be available until surface cleanup activities begin. However, the waste types identified comprise the majority of onsite wastes.

Table 4-2
POTENTIAL REMEDIAL ALTERNATIVES
BY WASTE TYPE

| Waste Type | Technology--Remedial Alternative |
|---|---|
| A. Corrosive liquids | 1. Onsite treatment--discharge to Metro (sewer system) |
| | 2. Onsite treatment--discharge to Mill Creek |
| | 3. Offsite treatment |
| | 4. Onsite treatment/HW landfill disposal--evaporation, residual disposal at hazardous waste (HW) landfill |
| | 5. HW facility disposal |
| B. Sludge from corrosive tanks | 1. HW landfill disposal |
| | 2. Onsite treatment/HW landfill disposal--drying or filtration and residue disposal at HW landfill |
| | 3. Onsite treatment/HW landfill disposal--solidify and haul to HW landfill |
| | 4. Onsite treatment/nonhazardous waste landfill disposal--encapsulate and haul to municipal landfill |
| | 5. Neutralize and haul to municipal landfill |
| C. Isopropyl alcohol mixture | 1. Offsite treatment/Metro discharge--discharge to Metro (with or without treatment) |
| | 2. Onsite treatment/nonhazardous waste landfill disposal--treatment and discharge to Mill Creek, residue to municipal landfill |

Table 4-2 (cont.)

| Waste Type | Technology--Disposal Alternative |
|---|---|
| | 3. Offsite treatment--haul to offsite treatment facility |
| | 4. Onsite treatment/nonhazardous waste landfill--onsite evaporation, haul residue to municipal landfill |
| | 5. Recycle/reuse--reuse |
| | 6. HW landfill disposal |
| | 7. Nonhazardous waste landfill disposal--municipal |
| D. Flue dust | 1. Nonhazardous waste landfill disposal--municipal |
| | 2. Hazardous waste landfill disposal |
| | 3. Reuse--sale and reuse |
| | 4. Onsite treatment--use as solidification aid |
| | 5. Codisposal--agent/coal mine disposal |
| | 6. Containment--onsite use as containment material |
| | 7. Release to potential responsible party (PRP)--appropriate disposal |
| E. Battery chips | 1. HW landfill disposal |
| | 2. Recycle/reuse--offsite recycle/reclaim |
| | 3. Incineration |
| | 4. Nonhazardous waste landfill disposal--municipal landfill |

Table 4-2 (cont.)

| Waste Type | Technology--Disposal Alternative |
|---|---|
| | 5. Release to PRP--appropriate disposal |
| | 6. Onsite use as solidification agent |
| F. Zinc oxide | 1. HW landfill disposal |
| | 2. Recycle/reuse--sale for recycle |
| | 3. Recycle/reuse--onsite use as solidification agent |
| G. Foaming agent | 1. Nonhazardous waste landfill--municipal |
| | 2. Recycle/reuse--sale for reuse |
| | 3. Offsite treatment/Metro discharge--discharge to Metro (with or without pretreatment) |
| | 4. Onsite treatment/nonhazardous waste landfill--treat and discharge to Mill Creek, residue to municipal landfill |
| | 5. HW landfill disposal |
| | 6. Return to manufacturer |
| | 7. Release for PRP--appropriate disposal |
| H. Wood pallets | 1. Incineration--onsite incineration |
| | 2. Incineration--offsite incineration |
| | 3. Nonhazardous waste landfill--municipal or demolition |
| | 4. HW landfill disposal |
| | 5. Recycle/reuse--reuse |

Table 4-2 (cont.)

| Waste Type | Technology Disposal Alternative |
|---|---|
| | 6. Onsite treatment--use onsite as solidification agent |
| I. Printing inks, tars, oils, and greases | 1. Onsite treatment/HW landfill disposal--onsite evaporation; haul residue to HW landfill |
| | 2. Onsite treatment/HW landfill disposal--solidification and haul to HW landfill |
| | 3. Nonhazardous waste landfill disposal--municipal |
| | 4. HW landfill disposal |
| | 5. Incineration--offsite incineration |
| | 6. Release to PRP--appropriate disposal |
| J. Tires | 1. Recycle/reuse--clean and sell/give away |
| | 2. Nonhazardous waste landfill disposal--steam clean, municipal landfill |
| | 3. HW landfill disposal |
| | 4. Incineration--offsite incineration |
| K. Nail coating | 1. Onsite treatment/nonhazardous waste landfill disposal--treat and discharge to Metro, residue to municipal landfill |
| | 2. Onsite treatment/nonhazardous waste landfill disposal--treat and discharge to Mill Creek (residue to municipal landfill) |

Table 4-2 (cont.)

| Waste Type | Technology--Disposal Alternative |
|---|---|
| | 3. HW landfill disposal |
| | 4. Recycle/reuse--recycle |
| | 5. Incineration--offsite incineration |
| | 6. Nonhazardous waste landfill disposal--municipal landfill |
| | 7. Solidify and haul to hazardous waste landfill |
| L. Unknowns | 1. HW landfill disposal--offsite HW landfill |
| | 2. Other technologies depending on characterization |
| M. Transformers | 1. HW landfill disposal |
| | 2. Incineration--offsite incineration of liquids |
| | 3. Offsite treatment/recycle/reuse--treat and recycle |
| | 4. Onsite treatment/recycle/reuse--treat and recycle |
| | 5. Onsite drain and flush--casings to municipal landfill, incinerate liquids |
| N. "Synfuels" | |
| a. Bunker oil | 1. Incineration |
| | 2. HW landfill disposal |
| | 3. Recycle/reuse--as fuel |
| b. High arsenic content | 1. Onsite treatment/recycle/reuse--dilute and recycle for pressure creosoting |
| | 2. Onsite treatment/recycle/reuse--treat to remove arsenic and reuse |

Table 4-2 (cont.)

| Waste Type | Technology--Disposal Alternative |
|---|---|
| | 3. Incineration--offsite incineration |
| | 4. HW landfill disposal |
| | 5. Offsite treatment/recycle/reuse--treat to remove arsenic and reuse |
| c. Mixed liquids | Same as Item a. above. |
| d. Liquids with MeCl | 1. Onsite treatment and discharge to Metro |
| | 2. Offsite treatment for recycling |
| | 3. Offsite incineration |
| | 4. Hazardous waste landfill disposal |
| e. Caustic liquids | 1. Sell or give away for reuse |
| | 2. Neutralize, solidify--haul to municipal landfill |
| | 3. HW landfill disposal |
| f. Unknowns | 1. Depends on characterization |
| O. Gypsum pile | 1. HW landfill disposal |
| | 2. Nonhazardous waste landfill--municipal |
| | 3. Recycle/reuse--reuse as fill |
| P. Fluids in gypsum pile | 1. Onsite treatment HW landfill disposal--treat and discharge to Mill Creek, residue to hazardous waste landfill |
| | 2. Offsite treatment--discharge to Metro (without treatment) |
| | 3. Onsite treatment/Metro discharge--treat and discharge to Metro |

Table 4-2 (cont.)

| Waste Type | Technology--Disposal Alternative |
|---|---|
| | 4. Offsite treatment |
| | 5. HW landfill disposal |
| | 6. Incineration--offsite incineration |
| Q. Sludge from bottom of tanks | 1. HW landfill disposal |
| | 2. Onsite treatment/HW landfill disposal--onsite drying or filtration and residue disposal at HW landfill |
| | 3. Onsite treatment/HW landfill disposal--solidify and haul to offsite HW landfill |
| | 4. Onsite treatment/HW landfill disposal--encapsulate and haul to offsite HW landfill |
| | 5. Nonhazardous waste landfill disposal--municipal |
| | 6. Incineration--offsite incineration |
| | 7. Incineration--onsite incineration |
| R. Tanks and scrap steel | 1. HW landfill disposal--haul as is to HW landfill |
| | 2. Onsite treatment/HW landfill disposal--cut and haul to HW landfill |
| | 3. Onsite treatment/HW landfill disposal--steam clean, cut, and haul to HW landfill |
| | 4. Onsite treatment/nonhazardous waste landfill disposal--steam clean, cut, and haul to municipal landfill |

Table 4-2 (cont.)

| Waste Type | Technology--Disposal Alternative |
|---|---|
| | 5. Onsite treatment/recycle/reuse--steam clean, and sell whole and/or cut and sell |
| S. Ponded water and decontamination water from operations | 1. Onsite treatment/Metro discharge--treat and discharge to Metro |
| | 2. Offsite treatment |
| | 3. HW landfill disposal |
| | 4. Treat--discharge to Mill Creek |
| | 5. Solidify--haul to HW landfill |
| T. Nonrecyclable solvents | 1. HW landfill disposal |
| | 2. Incineration--offsite incineration |
| | 3. Onsite treatment/HW landfill disposal--solidify and haul to HW landfill |
| | 4. Recycle/reuse--offsite recycler |
| | 5. Incineration--onsite incineration |
| U. Crystallized solids | 1. HW landfill disposal |
| | 2. Others, depending on nature of material |
| | 3. Nonhazardous waste landfill disposal--municipal |
| V. Laboratory chemicals | 1. HW landfill disposal |
| | 2. Recycle/reuse disposal--donate to local organization |
| | 3. Incineration--offsite incineration |

Table 4-2 (cont.)

| Waste Type | Technology--Disposal Alternative |
|---|---|
| | 4. Recycle/reuse--return to manufacturer |
| | 5. Detonation |
| | 6. Solidify or treat--haul to HW landfill |
| W. Pesticides | 1. HW landfill disposal |
| | 2. Incineration--offsite incineration |
| X. Paint waste, varnishes, and stains | 1. Nonhazardous waste landfill disposal--municipal |
| | 2. HW landfill disposal |
| | 3. Incineration--offsite incineration |
| | 4. Recycle/reuse--recycle |
| | 5. Solidify--haul to municipal landfill |
| Y. Flammable liquids | 1. Incineration--offsite incineration |
| | 2. Recycle/reuse--recycle |
| | 3. HW landfill disposal |
| | 4. Onsite treatment/HW landfill disposal--solidify, HW landfill |
| | 5. Onsite incineration |
| Z. Concrete blocks | 1. Onsite treatment containment--steam clean and use onsite in final closure |
| | 2. Onsite treatment/HW landfill disposal--steam clean, haul to municipal landfill |

Table 4-2 (cont.)

| Waste Type | Technology--Disposal Alternative |
|---|---|
| | 3. Onsite treatment/recycle/ reuse--steam clean and reuse offsite |
| | 4. HW landfill disposal |
| AA. Demolition debris | 1. Onsite treatment/recycle/ reuse--clean portions and recycle |
| | 2. Onsite treatment/nonhazardous waste landfill disposal-- clean, haul to municipal landfill |
| | 3. Onsite treatment/containment-- clean and bury onsite later |
| | 4. HW landfill disposal |
| | 5. Incineration |
| BB. Empty drums | 1. HW landfill disposal |
| | 2. Onsite treatment--crush onsite, haul to HW landfill |
| | 3. Onsite treatment/recycle/ reuse--steam clean, sell to recycler for offsite crushing and/or reuse |
| | 4. Onsite treatment/nonhazardous waste landfill--steam clean, haul to municipal landfill |

## Section 5
## REVIEW OF REMEDIAL ALTERNATIVES AND TECHNOLOGIES

Section 4 contains a total of 13 different remedial alternatives that were identified as candidates for cleaning up the 28 surface wastes present at Western Processing. A summary of the 13 alternatives, along with specific technologies considered within each alternative, is given in Table 5-1.

This section reviews each of the remedial alternatives and technologies for its relative merits and disadvantages for the site-specific cases developed at Western Processing. The information for this review was obtained by contacting more than 300 recyclers/reclaimers, process vendors, and hazardous waste processors and by using CH2M HILL's experience with hazardous waste cleanup and disposal.

Because of the large number of waste types, a discussion of the application of each alternative to each waste type would be lengthy and cumbersome. Also, the lack of sufficient characterization of many waste types compounds the problem of discussing application on a waste-by-waste basis. For these reasons, each alternative is discussed individually. The following specific areas are considered for each alternative and the technologies within that alternative:

- Description of alternatives
- Technical feasibility
- Constraints
- Implementation requirements (onsite and offsite)
- Characterization requirements
- Environmental impacts
- Regulatory requirements
- Potential risk considerations

### ONSITE TREATMENT

#### DESCRIPTION (ONSITE TREATMENT)

The Western Processing site contains contaminated water resulting from previous cleanup operations and from rainwater falling on contaminated surfaces, such as in empty tanks and on the ground surface. More contaminated water will be generated as the remaining surface wastes are removed from the site. One option for removing this waste is to treat it onsite in order to remove most of the contaminants and then discharge the water to the sewer or to Mill Creek. Mobile treatment equipment is readily available for this type of cleanup operation.

Table 5-1
POTENTIAL REMEDIAL ALTERNATIVES AND TECHNOLOGIES

| Disposal Alternative | Technologies Considered |
|---|---|
| 1. Onsite Treatment | Carbon adsorption<br>Air stripping<br>Precipitation/filtration/ clarification<br>Drying/dewatering<br>Sedimentation<br>Distillation<br>Solidification<br>Neutralization<br>Evaporation<br>Biological oxidation<br>Chemical oxidation/reduction<br>Rinsing/steam cleaning<br>Chipping/crushing<br>Liquid/liquid extraction<br>Encapsulation<br>Sludge conditioning (e.g., with fly ash) |
| 2. Offsite Treatment | Same potential technologies as for onsite treatment |
| 3. Nonhazardous Waste Landfill | Repackaging and/or onsite or offsite treatment may be required. |
| 4. Hazardous Waste Landfill | Partial solidification of liquids and/or repackaging may be required. |

Table 5-1 (cont.)

| Disposal Alternative | Technologies Considered |
| --- | --- |
| 5. Discharge to Metro | Onsite or offsite pre-treatment may be required. See the technologies for onsite treatment above. |
| 6. Discharge to Mill Creek | Onsite pretreatment will likely be required to meet discharge limitations. See the technologies for onsite treatment above. |
| 7. Incineration/Fuel Source | Hog fuel boiler (wood)<br>Cement kiln<br>Hazardous waste incinerator (e.g., at-sea incinerator)<br>Industrial boilers (oil fired)<br>Onsite portable boiler |
| 8. Recycle or reuse | Steam clean onsite; cut, crush, chip, onsite; repackage onsite; salvage, sell, give away. |
| 9. Detonation | -- |
| 10. Containment | Solidification, burial, crushing, chipping |
| 11. Return to Manufacturer | -- |
| 12. Release to Responsible Party | -- |
| 13. No action | -- |

For other wastes, such as sludges, other treatment technologies might be applied in order to render the material nonhazardous or to concentrate the material and thus reduce the cost of hazardous waste landfill disposal. Sludge dewatering or drying equipment, for example, could remove a significant volume of water from the sludge. Typically, mobile sludge dewatering equipment is available from vendors on a rental basis for pilot-scale testing to develop design criteria prior to purchasing full-scale equipment. A few companies do offer rental equipment for the specific application of hazardous waste cleanup.

TECHNICAL FEASIBILITY (ONSITE TREATMENT)

## Carbon Adsorption

Mobile units that perform carbon adsorption are available and the technology is well established. These units consist of packed beds of activated carbon that adsorb compounds from contaminated water. As contaminated water passes through a vessel packed with activated carbon, organics and some metals are adsorbed onto the surface of the carbon.

Since activated carbon has a large surface area to volume ratio, relatively small beds can treat large amounts of contaminated water. The removal effectiveness depends primarily on the adsorption characteristics of the contaminants and the contact time. Many organics and some metals can be reduced to below the parts-per-billion level. However, because activated carbon has a limited capacity for removal, it is typically used for waste streams with rather low concentrations. In addition, some contaminants will coat the carbon particles and prevent further adsorption of organics. For example, oily water greatly reduces the useful life of a carbon bed. In some instances a vessel packed with an oil absorbent can be placed ahead of the carbon filter to remove most of the oil and protect the carbon bed.

## Air Stripping

Air stripping is another technology designed to remove volatile organic contaminants from water. Typically, water passes down a packed column while air is blown up the column. The air strips the organics from the water, then passes with the air out the top of the column. The air-volume-to-water-volume ratio is generally very high. The high air volume combined with the typically low organics concentration in the water prevents significant degradation to the air quality in the treatment area. To extend carbon life, air strippers will, in most cases, precede activated carbon treatment. The air stripping removes the bulk of the organic contaminants and the carbon polishes the stripper effluent.

Air stripping technology is well-developed and reliable. Equipment is readily available so that response time for this option would be short.

Precipitation, Filtration, and Clarification

Lime or caustic addition followed by filtration or clarification is another technology that could be applied to Western Processing wastewater. This technology is most applicable for the removal of heavy metals from wastewater. Heavy metals such as lead will precipitate at elevated pH. The precipitate can be separated from the water either by filtration or clarification. The sludge can then be disposed of in a hazardous waste landfill.

This technology is reliable and the equipment to carry it out is available; however, chemical and sludge handling is messy and the process produces a sludge that must be handled as a hazardous waste.

Onsite processing units are capable of treating from 200 to 400 gpm. These rates will probably have to be reduced at Western Processing because of the limited storage facilities and extensive analytical requirements.

Sludge Dewatering or Drying

Treatment of sludge by drying or dewatering could be attractive with higher volumes of sludge and higher moisture content because costs to install the necessary equipment onsite may be lower than the savings in disposal cost. Currently, the volume and characteristics of the onsite sludges can only be roughly estimated, so the benefit of sludge dewatering or drying is difficult to quantify.

Any sludge treatment equipment would be designed and constructed to handle a wide variety of sludge types. If applied on corrosive sludges, the equipment should be able to withstand a wide range of pH variations. Since onsite sludges are likely to vary greatly in their ability to be dewatered, any technology that requires a tight specification regarding input characteristics is not appropriate. The most likely processes for onsite use appear to be either a precoat vacuum or pressure filtration unit. Dryers are too energy-intensive and solids-specific for application here.

Sedimentation

The settleable solids contained in wastewater can be removed via sedimentation. In this process, mixing and currents in the water are reduced to a minimum. In these quiescent conditions, the settleable solids eventually settle to the bottom of the water. The water is then decanted off, leaving the solids behind. Alternatively, a rake arm moves the solids to a sump in the bottom of the settling chamber where it can be pumped out. Sedimentation can be carried out as either a batch or continuous operation. Only comparatively large solids can be removed by this process. As the particle size decreases, the molecular forces within the water keep the smaller particles in suspension.

It is expected that this technology will have little onsite application for wastes at Western Processing compared to other, more feasible technologies.

Distillation

Distillation is the boiling of a liquid solution and condensation of the vapor for the purpose of separating the component ingredients. These relatively pure materials can then be reused in various industrial processes. This technology is not expected to be as applicable to onsite treatment as other, more feasible technologies.

Solidification

Solidification is the process in which liquids are mixed with a dry material to produce a moist composite. Since the disposal of liquids in landfills has been halted, solidification is becoming more commonly practiced by treatment, storage, and disposal (TSD) facilities. Manual solidification of liquids requires a solidifying agent to liquid ratio of approximately eight to one. Because automated systems can mix the components so much more thoroughly, they can often be operated at ratios of four to one or even three to one. These ratios assume a soil-type solidifying agent. Other dry absorbent solids such as lime or fly ash are also used routinely.

This technology was used at Western Processing during emergency cleanup efforts and is anticipated to be technically feasible for use in additional cleanup activities.

Neutralization

There are many acceptable methods for treating acidic or basic wastes. Treatment of both types of waste is based upon chemical neutralization, usually to pH 6 through 9. Methods include:

- Mixing acid and alkaline wastes so that the net effect is near-neutral pH
- Passing acid wastewaters through beds of limestone

- Mixing acid wastes with lime slurries or dolomite lime slurries

- Adding the proper amounts of concentrated caustic soda (NaOH) or soda ash ($Na_2CO_3$) to acid wastewaters

- Adding strong acid to alkaline wastes

All these techniques are well established and have been employed in treating acid or alkaline industrial wastes. The choice of an acidic reagent for neutralization of an alkaline wastewater is generally between sulfuric and hydrochloric acid. The selection of a caustic agent to neutralize an acid waste is usually between sodium hydroxide, sodium carbonate, and various limes.

Neutralization is feasible for use at Western Processing, and its feasibility is compared to that of other alternatives in Section 6.

Evaporation

Many wastewaters can be evaporated. Typically, evaporation takes place in ponds that use solar energy to drive the process. Disposal by evaporation is limited by geographic location, climate, and land availability. The use of evaporation for disposal of wastewater can also be constrained by the contaminants in the water. If the water is heavily contaminated with oil, an oil film will form on top of the water and reduce evaporation rates significantly. The presence of certain volatile organics makes evaporation of wastewater unacceptable since air discharge of these materials may be restricted.

This technology is currently being used to reduce somewhat the volume of surface water present on the site. Its application to wastes is feasible but might be less feasible than other alternatives. The relatively wet Puget Sound climate precludes solar evaporation at Western Processing for all but very small volumes. Electric or steam driven mechanical evaporators can be brought onsite, but energy and mobilization costs are very high.

Biological Oxidation

Simple and complex organic molecules can be reduced to carbon dioxide and water via biological oxidation. In this process, organic-laden wastewater is exposed to high concentrations of microorganisms in an aerobic environment. The microorganisms use the organic material in the water as an energy source and in the process reduce the molecular structure of the organic materials to lower molecular weight organics or to water and carbon dioxide.

Biological treatment processes do not alter or destroy most inorganics (reduced sulfur species and cyanide are examples of exceptions). In fact, these materials and other substances that are toxic to the microorganisms must be kept to a minimum.

Chemical Oxidation/Reduction

Chemical oxidation and reduction can be used to treat both organic and inorganic compounds. The chemical oxidation of organic compounds generally reduces them to lower molecular weight compounds or to carbon dioxide and water. Chemical treatment or inorganic materials generally modify the oxidation state of the material to produce a more innocuous material. For example, hexavalent chromium is treated by reducing it to trivalent chromium through the addition of a reducing agent such as sulfur dioxide or ferrous sulfate. The trivalent chromium can then be removed from the wastewater via hydroxide precipitation. Other identified alternatives may be considered in the initial screening process as more feasible for this application.

Rinsing/Steam Cleaning

Many solids that are contaminated with hazardous waste can be decontaminated simply by rinsing or steaming the hazardous material off. This technique is particularly effective for nonporous materials such as tires, drums, and tanks. The process is not as effective on porous materials, since the hazardous wastes are usually absorbed into the matrix of the material. Unfortunately, this process generates a liquid stream that must be treated as a hazardous material.

Chipping/Crushing

Although chipping or crushing would not normally be considered a specific treatment process, it does represent handling of the waste and for purposes of this report has been grouped into this category. In many cases, large containers such as tanks and barrels must be crushed or chipped up to reduce their volume for disposal. If the chipped or crushed material is to be recycled, it will probably need to be decontaminated first. If it is merely being reduced for shipment to a hazardous waste landfill, it might not need decontamination. Chippers and crushers will have to be decontaminated before being removed from the site if they handle contaminated materials.

Liquid-Liquid Extraction

Liquid-liquid extraction is a separation technique that involves two immiscible liquid phases. It is an indirect separation technique because two components are not separated directly. A foreign substance, an immiscible liquid, is introduced to provide a second phase. For example, water may be contaminated with nonpolar organic materials. A nonpolar solvent such as hexane can be mixed with the water. As the two are mixed the nonpolar organics leave the polar aqueous phase and enter the nonpolar hexane. Once the mixing stops, the hexane will separate and float on top of the water. The hexane is then be decanted off, taking the organic contaminants with it. As with distillation, this is an equilibrium process, so that organic contaminants can be reduced but not eliminated. In most cases, this technique is not cost-effective for obtaining the low concentrations desired for hazardous waste treatment and therefore could probably not be applied effectively to reduce contaminants onsite.

Encapsulation

Encapsulation isolates the waste particulates from the environment. Encapsulation processes depend on coating and binding the solid particles together into a single mass. Most encapsulation processes require a dry sludge or one with a low water content. No reaction with any constituent in the sludge is required and, in some cases, variations in processing are used to prevent any chemical reaction from occurring.

Certain encapsulation techniques involve a two-phase process: the coated or bonded waste is enclosed in an additional container that will adhere closely to the binder and further isolate the waste from the environment. This secondary container may be a steel drum or a plastic liner that also provides protection from the waste during transport and landfilling. These secondary containers isolate the waste particulates that would normally appear on the surface of the bonded waste block and prevent the surfaces from leaching.

In the past, encapsulation has been limited in application because of high costs of the encapsulating materials. This process has been used predominantly on low-volume, high-toxicity wastes, a combination that would not be expected at Western Processing.

Sludge Conditioning

The water content in sludges varies considerably. Some sludges are easily dewatered; others are not. In many cases it is advantageous to dewater sludge prior to disposal in order to reduce its weight and bulk. The sludge conditioning process modifies the sludge to allow it to be dewatered more easily. In most cases a drainage aid is added to the sludge which is then dewatered in a filter press or similar dewatering device. This extra treatment step is not expected to be needed for wastes at Western Processing.

CONSTRAINTS (ONSITE TREATMENT)

The major constraints for use of any of the technologies involve the consistency of the waste for treatment, potential contamination present within the waste, and volume of waste sufficient for onsite treatment. Use of mobile treatment units and other onsite treatment technologies could be precluded if the waste consistency (solid, liquid, or sludge) is not what has been described. Testing would have to be conducted to determine if the contaminants in the waste can be properly treated by the technology. The waste volume is a factor that will affect the cost-effectiveness of each technology.

IMPLEMENTATION REQUIREMENTS (ONSITE TREATMENT)

Onsite

The onsite requirements for handling and treating liquid and solid wastes onsite are minimal. In all cases, the cleanup contractor would bring the necessary equipment onsite. Typically these units are self-contained and do not take up much space. Some analysis of the wastewater would be required to determine the best treatment scheme and a pilot test may be needed to identify if the process is feasible. Several tanks located onsite would probably be needed to bulk the wastewater for treatment and to hold the treated water until analysis indicated it was acceptable for discharge either to the Metro sewer system or to Mill Creek.

Offsite

This alternative would only involve onsite treatment. The equipment is already in place to receive discharges from the site either via the sewer or Mill Creek. Depending upon the volumes involved, the sewer line may have to be temporarily enlarged. Solids onsite would be stacked in sections in preparation for offsite removal if determined that the waste cannot remain onsite as part of permanent containment.

CHARACTERIZATION REQUIREMENTS (ONSITE TREATMENT)

The characterization requirements for onsite treatment vary with the type of treatment process to be employed, the type of waste, and the effluent criteria that must be met. The extent of chemical analysis to be performed ranges from minimal for chipping and grinding to extensive for complex treatment processes such as biological wastewater treatment or air stripping.

Proper characterization is important not only for determining process design criteria, but also for determining materials of construction. Liquids (i.e., wastewater) must be characterized prior to treatment in order to determine the optimum treatment scheme. The concentration of oils and sludge-type material that might foul the carbon bed would have to be determined. The concentration of organic contaminants would also have to be determined in order to evaluate the need for air stripping, project the carbon bed contact time, and estimate the useful life of the carbon. A heavy metals analysis would be conducted in order to determine the need for lime precipitation. Most of these analyses are relatively simple, quick, and inexpensive. Therefore, once the wastewater is collected and bulked, the analyses of the wastewater and the development of the optimum treatment scheme is not a constraint on proceeding with this option.

Analysis of the treated water, however, could be a significant constraint. If the regulatory agencies or Metro required an analysis of the water prior to discharge, the cost and time requirements to complete the cleanup in this way could increase significantly. Characterization might include items such as heavy metals, priority pollutants, and/or hazardous substances.

Analysis of sludges is required to determine solidification requirements, compatibility with other sludges, dewaterability, materials selection, and design criteria for equipment selection. The degree of analysis will depend on the type of process to be used. It is likely that pilot and bench-scale testing will be necessary for determining the type of drying or dewatering equipment required.

ENVIRONMENTAL IMPACT (ONSITE TREATMENT)

The environmental impact resulting from onsite treatment and handling would most likely be small. However, if the operation were improperly conducted or a mistake in analysis occurred, the potential environmental impact could be great. In such a case, the potential exists to spread contaminated water into Metro's systems or along the banks of Mill Creek and downstream.

REGULATORY REQUIREMENTS (ONSITE TREATMENT)

Any onsite hazardous waste treatment processes will probably have to meet RCRA and state hazardous waste treater regulations. Further evaluation of the applicability and constraints of these regulations will be conducted during the detailed analysis of alternatives.

Onsite treatment of wastewater should not present insurmountable regulatory problems. The technology is well-developed and is being practiced in many places around the country. However, discharge of the treated water either to the sewer or to Mill Creek may meet with institutional opposition. Because of the sensitive nature of this project, Metro officials may be reluctant to accept the treated water even though significant analyses are performed. Even greater concern may be voiced by state officials regarding the discharge of the water to Mill Creek. The Metro discharge option should be better received due to a higher perceived level of control and the contingency provided by the downstream secondary plant at Renton. The process of treating hazardous waste onsite must meet the intent of the Washington hazardous waste regulations for treaters.

POTENTIAL RISK CONSIDERATIONS (ONSITE TREATMENT)

Because these technologies are well understood and laboratory techniques are sufficient to detect extremely low levels of organic contaminants, the actual probability of risk associated with this alternative is relatively low. However, the potential risk is large should the process or analytical techniques fail. A major cleanup effort could result if unacceptable levels of contaminants were discharged from the site.

## OFFSITE TREATMENT

DESCRIPTION (OFFSITE TREATMENT)

Several aqueous wastes located on the Western Processing site might be suitable for offsite treatment and disposal. These wastes are water, presumably contaminated with low concentrations of heavy metals. A wide variety of organic contaminants are likely to be present in these wastes. Several offsite treatment facilities in the local area are capable of treating this water to remove the metals, making it suitable for discharge to the sewer. In addition, these facilities are equipped to neutralize corrosive materials for discharge to the sewer.

Lime precipitation is the most commonly used technique for removing heavy metals from water. Metro discharge permits issued to offsite treatment facilities typically regulate cadmium, chromium, copper, lead, nickel, and zinc to 3 to 6 ppm. Normally these limits are met easily.

Lime precipitation of water does not usually achieve high removal efficiency for organic materials. Air stripping and carbon absorption would be required to remove the organics to acceptable levels. None of the local facilities contacted have this equipment.

Some of these facilities can process corrosive liquids. Generally, the liquid is neutralized to form a neutral salt solution, which is then discharged to the sewer. As with lime precipitation, neutralization will not remove or destroy organic contaminants to the degree necessary for discharge to the sewer and if organics are identified as being present in the liquid, this technology would not be applied.

Treatment facilities also provide temporary offsite storage of hazardous wastes. Treatment facilities usually have onsite storage capabilities to provide for offloading of incoming trucks and the combining of several smaller waste volumes into large batches for treatment. Because these offsite treatment facilities also provide temporary storage, they could be quite useful for the surface cleanup at Western Processing. Waste could be transported offsite, out of the way of other activities, at a faster rate than would be possible if onsite treatment were initiated. Onsite treatment might require materials handling such as onsite batching and testing of small volumes of liquids that could probably be done more efficiently at an offsite facility.

TECHNICAL FEASIBILITY (OFFSITE TREATMENT)

Lime precipitation and neutralization are well developed technologies that have been used for decades to treat wastewater and corrosives. Properly monitored, they are safe and reliable.

CONSTRAINTS (OFFSITE TREATMENT)

The processes described above are designed for wastewater streams and corrosives. Contaminants that would not be acceptable in these streams include:

- Chlorinated hydrocarbons
- Low flashpoint hydrocarbons
- PCB's
- Phosphate ester oils
- Nonflammable lubricants
- Other organics that would violate the discharge permit

In addition, most facilities are limited to the amount of liquids they receive each day (between 20,000 and 60,000 gallons per day).

IMPLEMENTATION REQUIREMENTS (OFFSITE TREATMENT)

Onsite

To implement this option, the liquids considered for treatment would have to be sampled and analyzed to ensure that they contain no unacceptable contaminants. If acceptable, the liquids would be pumped into a tank truck and hauled to the treatment facility. The major site requirement would be to collect the samples for analysis.

Offsite

No special offsite requirements would be necessary since these treatment facilities are already set up for this type of process.

CHARACTERIZATION REQUIREMENTS (OFFSITE TREATMENT)

The streams to be treated would have to be tested sufficiently to ensure that they contain no unacceptable contaminants that might adversely affect the treaters' processing equipment or might pass through the treatment and be discharged to the sewer. Past data indicate that cross-contamination may have occurred onsite, so this analysis could be extensive. To reduce time and costs, these waters would probably be bulked into tanks before sampling.

ENVIRONMENTAL IMPACTS (OFFSITE TREATMENT)

The environmental impact of this disposal alternative would mostly likely be insignificant because its objective is to reduce the hazard of the waste. However, the potential environmental impact could be significant if the analysis were incorrect and unacceptable material were processed and discharged to the sewer. In such a case, the potential exists to spread contaminated water into Metro's system.

REGULATORY REQUIREMENTS (OFFSITE TREATMENT)

Application of onsite treatment technologies will involve approval for use from both the EPA and WDOE. The acceptance of any technology for use will be determined after detailed analysis of alternatives is complete.

POTENTIAL RISK CONSIDERATIONS (OFFSITE TREATMENT)

Because these technologies are well understood and laboratory techniques are sufficient to detect extremely low levels of organic contaminants, the actual probability of risk associated with this disposal alternative is relatively low.

There would always be the potential for risk should the analytical techniques fail. If unacceptable levels of contaminants were discharged from the treatment facility, short-term impacts on the Metro system could be a problem.

NONHAZARDOUS WASTE LANDFILL

The Washington State Solid Waste Management, Recovery and Recycling Act assigned local governments the responsibility for handling the disposal of solid wastes. Local health departments are assigned the enforcement function subject to standards established by the State Department of Ecology (Minimum Functional Standards for Solid Waste Handling--Washington Administrative Code 173-301) or standards adopted by the local health department of equivalent or greater stringency. King County contains landfills operated by the County, the City of Seattle, small municipalities, and private industry (Figure 5-1). None of these landfills accepts wastes classified as dangerous by WAC 173-303. None of the landfills in Snohomish County (north of King County) or Pierce County (south of King County) accepts dangerous or hazardous wastes. However, the various landfills have different specifications regarding the acceptable levels of contamination, size, and physical properties of the wastes they will accept.

DESCRIPTION (NONHAZARDOUS WASTE LANDFILL)

There are five major types of solid waste, each identified by source. They are:

1. Residential or domestic wastes: produced in homes, apartments and residential institutions. Residential and commercial wastes are generally known as mixed municipal solid waste.

2. Commercial wastes: produced by commercial activities and services. Major contributors to the commercial waste stream are the retail, services, wholesale, transport, communications, utilities, government, and education sectors. Manufacturing companies produce commercial wastes from that portion of their operations that are not industrial in nature.

3. Industrial wastes: produced as the result of the manufacturing and processing activities that take place in factories, plants, refineries, and other industrial facilities.

4. Special wastes: originate from all the above sources, but require special treatment for proper disposal. Included are agriculture, nonhazardous

chemical, wood, and automotive construction and demolition wastes; wastewater treatment sludges; pollution control residuals; and septic tank pumpings.

5. Hazardous wastes: defined as dangerous or extremely hazardous in accordance with Chapter 173-303 of the Washington Administrative Code. Dangerous waste must be generated at a rate in excess of 400 pounds per month to be regulated by the Washington State Department of Ecology.

The physical components of the waste stream have an important influence on the ease with which the waste is handled, transported, and disposed. The landfill system must successfully handle the waste, and often prohibits the disposal of unmanageable waste such as liquids, sludges, oversize timbers, and auto bodies.

Waste disposal throughout the system is becoming more specialized. Special final disposal sites have been developed to receive building demolition and land clearing wastes, certain commercial wastes, and other nonpesticide wastes. None of the landfills in King, Pierce, or Snohomish Counties or elsewhere in the state of Washington accept extremely hazardous wastes, and only some accept special wastes. Combined residential and commercial solid waste constitute the bulk of the material passing through the public solid waste handling and disposal system.

Since none of the landfills close to Western Processing (or elsewhere in this state) accept dangerous or hazardous wastes, only the materials at Western Processing that can be shown not to exceed the acceptable levels of contamination for each facility could be disposed of through this alternative. Table 5-2 lists the accepted waste types taken by the various landfills in and around King County.

The landfills that are recommended by the county health departments for disposal of Western Processing nonhazardous wastes include the Kent Highlands, Cedar Hills, and Newcastle landfills in King County; the Cathcard and Bryant landfills in Snohomish County; and the City of Tacoma, Thun Field, Purdy landfills in Pierce County.

TECHNICAL FEASIBILITY (NONHAZARDOUS WASTE LANDFILL)

The landfills recommended by the three local county health agencies as feasible options for disposing of Western Processing nonhazardous wastes, and the associated restrictions and applications relating to such wastes, are listed below.

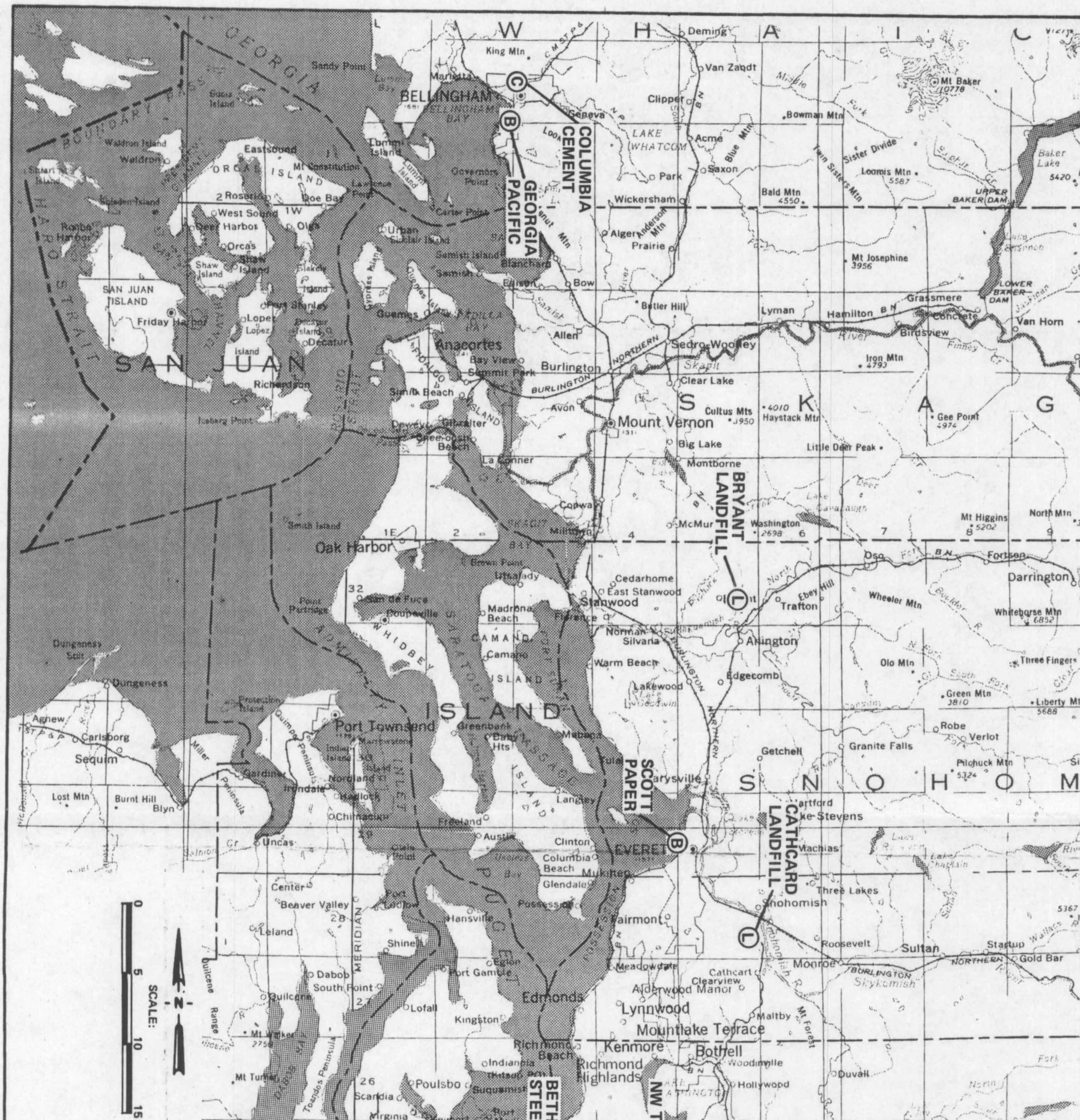


Figure 5-1
REPRESENTATIVE LOCAL LANDFILLS, RECYCLERS, TREATMENT FACILITIES, BOILERS, CEMENT PLANTS, AND METAL MELTING FACILITIES

EA0110

Table 5-2
WASTE TYPES ACCEPTED BY LOCAL LANDFILLS

| Landfills | Garbage (putrescible) | Rubbish (nonputrescible) | Industrial Waste | Demolition | Abandoned Vehicles | Dangerous Wastes (WAC173-303) | Liquid Wastes | Tires |
|---|---|---|---|---|---|---|---|---|
| King County | | | | | | | | |
| Cedar Hills | X | X | X | X | | | | |
| City of Seattle | | | | | | | | |
| Kent Highlands | X | X | X | | | | | X |
| King County Private | | | | | | | | |
| Newcastle | | X | | X | | | | |
| City of Tacoma | X | X | X | X | | | | X |
| Pierce County Private | | | | | | | | |
| Thun Field | X | X | X | X | | | X | X |
| Purdy | X | X | | X | | | | X |
| Snohomish County | | | | | | | | |
| Cathcart | X | X | X | | | | | X |
| Bryant | X | X | X | | | | | X |

| Landfill | Restrictions |
|---|---|
| City of Seattle<br>Kent Highlands | Wastes must be generated from the city limits of Seattle or Kent<br><br>Delivery trucks must be 12,000 pounds gross or over<br><br>Waste material must be small enough to be moved by D7-size bulldozers<br><br>Generally take residential wastes but will take some larger material |
| King County<br>Cedar Hills | No large demolition material, smaller wood or debris accepted |
| Private in King County<br>Newcastle | Large demolition material accepted |
| Snohomish County<br>Cathcart | No large volumes of wood or demolition debris |
| Bryant | Accepts demolition material from trucks under 8,000 pounds gross |
| City of Tacoma | No large demolition material, stumps, tires |
| Private in Pierce County<br>Thun Field | No size restrictions |
| Purdy | No industrial wastes, especially chemicals. Wastes must be small enough to handle with landfill equipment. |

There are numerous municipal landfills around the state. If a municipal landfill is a viable disposal option, further research into other western Washington site options might be beneficial.

CONSTRAINTS (NONHAZARDOUS WASTE LANDFILL)

Material from Western Processing will have to be cleared through the county health departments prior to disposal at any of the landfills. Recommendations and restrictions made by Seattle-King County Department of Public Health for disposal of Western Processing wastes include:

- Composite sampling of prospective wastes to show that the material contamination levels are below the threshold levels set by the county (the county is developing threshold levels for such waste types)

- No liquids

- Minimum of sludge and slurry (must be nonhazardous)

- No liquid in drums

- Approval by the WDOE of cement flue dust

Snohomish County's Environmental Health Department does not accept any wastes that are classified as dangerous or hazardous, as defined by the WDOE. Material from Western Processing would have to be sampled and analyzed to show that it is not dangerous or hazardous.

Pierce County's Environmental Health Department also follows the WDOE's regulations for defining dangerous and hazardous wastes. Pierce County will not accept any dangerous or hazardous wastes. A waste authorization from the Pierce County Health Department and approval from the private landfill owners would also be needed.

IMPLEMENTATION REQUIREMENTS (NONHAZARDOUS WASTE LANDFILL)

Onsite

The first step in the process of determining whether any of the Western Processing wastes can be disposed of at the landfills is to obtain composite samples of each group of materials being considered. Wastes are not accepted at these landfills if they have been analyzed and determined to be regulated waste under WDOE dangerous waste regulations. As the sampling and analysis results come back, the nonhazardous material can be sorted and grouped onsite for transport to the landfills.

The landfill or the state may require several analyses to prove that the materials will be safely disposed. All or part of the following analyses would probably be required:

Extraction procedure (EP) toxicity

Bioassay (fish or rat)

Polycyclic aromatic hydrocarbons (PAH)

Total halogenated hydrocarbons

PCB

Any other judged necessary by the county health departments

Sample collection would depend on the waste stream. Wipe samples may be collected from solid materials; composite samples may be collected from bulk materials.

Offsite

Bulk solid materials removed from the site would be loaded into open flatbed trucks. Material that might be dispersed by wind would have to be transported in closed trucks. Appropriate truck sizes would have to be coordinated with the landfill operation personnel.

ENVIRONMENTAL IMPACTS (NONHAZARDOUS WASTE LANDFILL)

Sampling the prospective material for landfill disposal presents the main health and safety consideration. Since the material has not been characterized at this point, every precaution should be taken while handling it. If the material was not analyzed sufficiently or if some material was mistakenly transported to the landfills, an impact on the surrounding environment could result. However, the landfills recommended by the health agencies conform stringently to set landfill standards. Therefore, the material would be fairly well contained once in the landfill, providing an additional safety valve to this disposal alternative.

REGULATORY REQUIREMENTS

A major concern of the county health agencies (especially King County) is the political ramifications of disposing of Western Processing wastes at public landfills. Each agency will require screening of the material to assure it falls into the acceptable legal categories for disposal of this sort.

POTENTIAL RISK CONSIDERATIONS (NONHAZARDOUS WASTE LANDFILL)

Municipal and demolition landfills throughout the country are being considered for or being designated as Superfund (CERCLA) sites because of past operating practices that allowed for disposal of hazardous materials before there was knowledge of their hazard. Shipment of materials to any nonhazardous landfill could result in reexcavation of the materials if the site at some future date were to become a hazardous waste site requiring cleanup.

## HAZARDOUS WASTE LANDFILLS

### DESCRIPTION (HAZARDOUS WASTE LANDFILLS)

Chemicals deemed to be wastes that cannot be recycled and that have contaminants high enough to be designated by the WDOE Dangerous Waste Regulations (WAC 173-303) as dangerous or extremely hazardous must be treated or disposed of by an approved treatment, storage, and disposal (TSD) facility.

Under the EPA hazardous waste regulations, hazardous waste landfills are designated as one type of TSD facility. Hazardous waste in the State of Washington can be stored and disposed of by two types of facilities: dangerous waste landfills and extremely hazardous waste landfills. There are currently no dangerous waste landfills in Washington that could accept waste such as has been identified at Western Processing, nor does Washington have an extremely hazardous waste landfill. Currently, dangerous and extremely hazardous wastes in Washington are sent out of state to EPA-approved hazardous waste landfills (Figure 5-2).

Hazardous waste landfills often use both trench landfill disposal techniques and also treatment capabilities such as neutralization of acids, cyanide destruction, filtration, precipitation, decanting and biodegradation. Disposal methods include landfarming, landfilling, and solar evaporation. Techniques used at these landfills include solidification.

### TECHNICAL FEASIBILITY (HAZARDOUS WASTE LANDFILLS)

Virtually all surface materials at the Western Processing site could be disposed of in an EPA-approved hazardous waste landfill. These facilities must comply with appropriate government regulations (RCRA, TSCA) and receive their operating permits from the EPA or the states in which they are located. Most facilities are subject to frequent inspections by state and federal representatives to ensure that site operations are conducted according to regulations. Therefore, the risk of short-term liability associated with this type of disposal is minimized.

The ultimate disposition of materials at a hazardous waste landfill depends upon the nature of the material, such as its physical state or the contaminants it contains, and the volume and space capability of the facility. The availability of options may vary from site to site.

### CONSTRAINTS (HAZARDOUS WASTE LANDFILL)

Although disposing of Western Processing materials at a hazardous waste landfill would provide for permanent

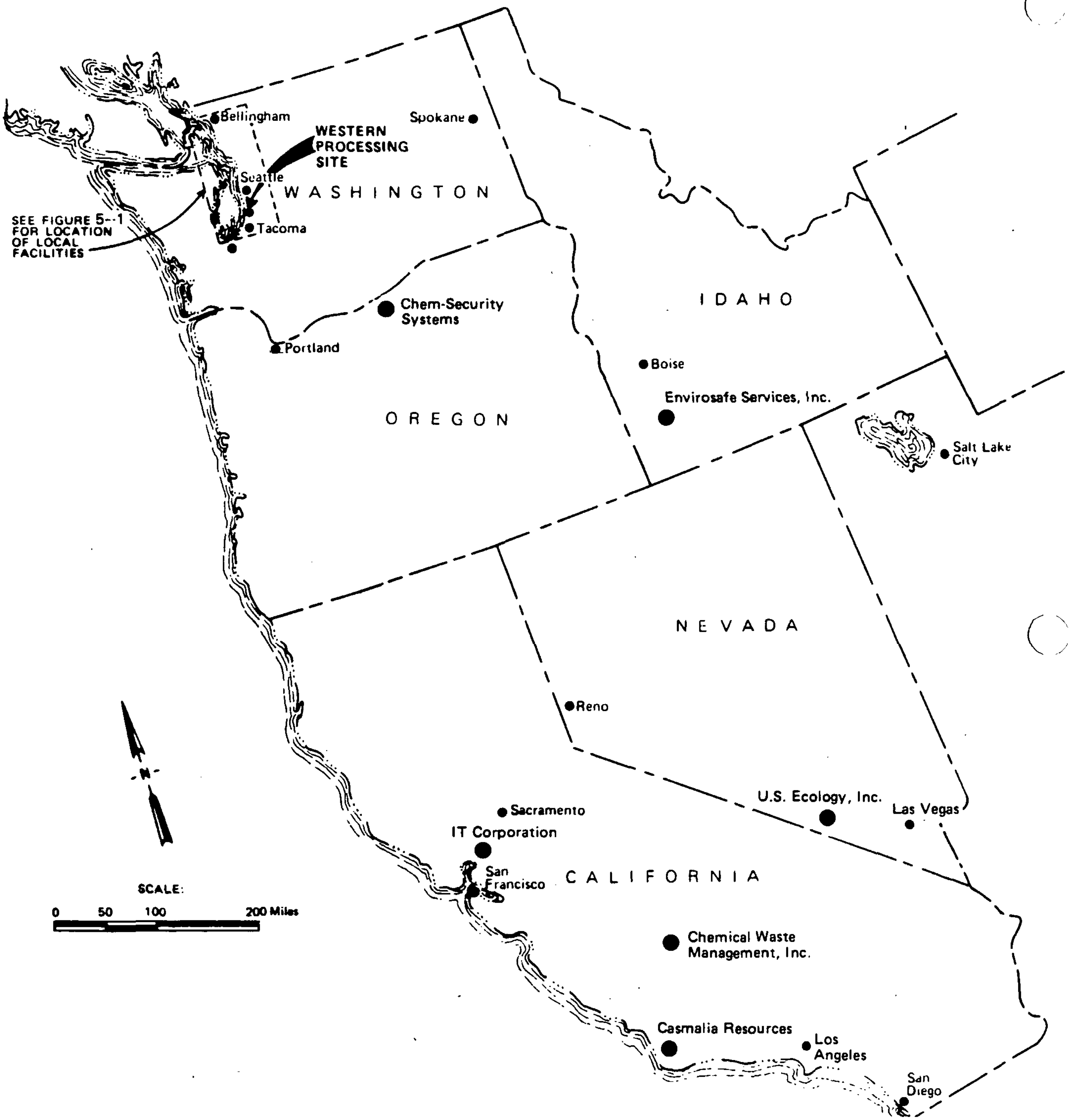


**Figure 5–2**
**MAJOR REGIONAL HAZARDOUS WASTE LANDFILLS**

containment, it also would have some constraints. Hazardous waste landfills cannot receive materials for treatment or disposal without substantial analysis. A waste material profile sheet accompanies each incoming waste shipment. The material profile sheet requires a 100-percent accounting of the total chemical composition of each waste.

In addition, the landfills will not accept all types of wastes. For example, most will not accept water reactive materials, explosives, cyanides, and sulfides above certain concentrations. Some wastes at Western Processing could likely be unacceptable, at least by regional hazardous waste landfills. For these wastes, other disposal options will have to be found or hazardous waste landfills outside the region will have to be located that will accept the materials.

The time requirements to implement this disposal option are significant. Materials onsite must be sampled and analyzed sufficiently to meet the landfill's requirements. Once an analysis is available the landfill personnel must review the information to determine if it is adequate for their needs. The landfill often requests samples of the waste for its own analysis (see Characterization Requirements, below). If the landfill determines that the material is acceptable, in most cases the request must then be reviewed by a state agency for acceptability. Time requirements for this review have reportedly varied from one to eleven weeks.

IMPLEMENTATION REQUIREMENTS (HAZARDOUS WASTE LANDFILL)

Onsite

The onsite requirements to implement this disposal option depend on how many waste types will be disposed of in this way. As discussed above, any waste stream considered for this option must be sampled and analyzed. In most cases the TSD facility will require its own analysis of each waste in addition to any previous analysis that has been taken. There are a variety of solid materials onsite, including empty drums, pallets, battery chips, flue dust, and gypsum piles. A representative sample must be collected from any waste that is considered for disposal at a landfill facility. In the case of large piles of solids such as the flue dust, obtaining a representative sample could be difficult and time consuming. Obtaining representative samples from absorbent materials such as the wooden pallets could also be difficult.

Obtaining representative samples from the liquids in tanks will be easier; however, each tank may hold several layers of liquids and each of these layers must be sampled and analyzed. Since the structural integrity of these tanks is unknown, extreme caution will have to be used.

For drummed materials, each drum will have to be opened and sampled. An analysis could be made of each sample, but this process would be costly and time consuming. An alternative is to test the contents of each drum for compatibility and bulk compatible liquids together. The bulked material could then be sampled and analyzed.

In summary, the requirements for sampling the materials onsite could be extensive. Movement of materials onsite will be required to allow access to drums, piles, and other wastes.

Once the materials onsite are sampled and analyzed, the drummed liquid and miscellaneous scrap should be segregated on the site by compatibility and hazard for the purpose of loading compatible wastes for transport offsite. Site requirements for handling and loading will include establishment of clean zones and decontamination areas for personnel and trucks, removal of surface water from the site, and solidification of some liquids for shipment to landfills that do not accept liquids.

Offsite

Liquids removed from the site for disposal will be transported by bulk tank trailer or vacuum tank trailer. Pumpable sludges will be removed from the site in bulk or vacuum tank trailers. Nonpumpable sludges could be solidified onsite and removed together with other solid materials in lined and covered dump trucks. All vehicles leaving the site must be decontaminated.

CHARACTERIZATION REQUIREMENTS (HAZARDOUS WASTE LANDFILL)

Federal regulations require landfills to obtain an analysis of any material to be handled on their site sufficient to safely receive, treat, store, and dispose of that material. These regulations have caused the analysis requirements to increase in recent years. The characterization requirements include:

- Color
- Physical state (solid, liquid, sludge)
- Consistency (relative viscosity)
- pH

- Flash point
- Specific gravity
- Chemical components (organic pollutants, inorganic pollutants, volatile organics, pesticides, PCB's)
- Hazard class
- Shipping name
- Hazardous waste identification number

ENVIRONMENTAL IMPACT (HAZARDOUS WASTE LANDFILL)

Disposal of hazardous wastes in landfills is designed to have minimal environmental impact. This does not guarantee, however, that mismanagement, natural disaster, or other unforeseen circumstances will not result in the uncontrolled release of hazardous waste from these facilities at some future date. The environmental impact of such an occurrence cannot be estimated at this time.

REGULATORY REQUIREMENTS (HAZARDOUS WASTE LANDFILL)

The mechanisms for disposing of hazardous materials at the landfill have been developed by state and federal regulatory agencies. Therefore, if the existing regulations are met, there should be no additional regulatory constraints.

POTENTIAL RISK CONSIDERATIONS (HAZARDOUS WASTE LANDFILL)

The risk associated with this disposal scheme should be minimal, assuming that adequate perpetual care, monitoring, and safety precautions are followed in sampling and handling the waste materials. Use of a permanent containment technology does not eliminate potential long-term risk; an approved hazardous waste landfill could at some time become contaminated and require cleanup. Long-term risks are minimized by adherence to the stringent regulations to which hazardous waste landfills are subject and because these facilities are monitored regularly. In addition, hazardous waste landfills have set aside funds for long-term care and use in the event of future contamination.

## DISCHARGE TO METRO

DESCRIPTION (DISCHARGE TO METRO)

The Municipality of Metropolitan Seattle (Metro) is the agency responsible for the sewage treatment activities and water quality monitoring in King County. Metro operates and maintains the sewage treatment plants (and main trunk sewer lines) in King County. The cities around Seattle are responsible for the lines entering Metro's trunk lines and for issuing permits for sewer hookups. Each city in turn must meet Metro's requirements. Metro's Industrial Waste Section issues discharge permits and monitors industrial companies discharging into the system. The Industrial Waste Section also has enforcement authority and issues fines to companies that do not conform to their discharge permit requirements.

Discharge from Western Processing would flow to Metro's Renton secondary treatment plant and subsequently be discharged into the Duwamish River. Metro's Renton treatment plant has an NPDES permit from the EPA for its discharge into the Duwamish River. Metro's compliance with its WDOE NPDES permit, the Renton plant's treatment capabilities, and safety factors for maintaining the sewer lines dictate the waste types that are allowed to enter the system. These factors force strict limitations on the maximum levels of contaminated, dangerous, or hazardous wastewater for discharge into the Metro system.

TECHNICAL FEASIBILITY (DISCHARGE TO METRO)

Wastes from Western Processing that could be discharged into the Metro line include contaminated sanitary wastewater and stormwater, if it complies with discharge permit specifications.

The sampling and monitoring activities required to comply with the Metro discharge permit specifications assure that the waste types can be appropriately and adequately handled by the Metro system. The permit specifications would be similar to those outlined in the draft Waste Discharge Permit compiled for Western Processing in 1983. Metro will require pretreatment for heavy metals and will not accept solvents. Table 5-3 shows the volume limitations necessary to comply with the draft discharge permit for stormwater runoff at Western Processing.

Table 5-3
WESTERN PROCESSING
DRAFT DISCHARGE PERMIT
VOLUME LIMITATIONS

| Type | Quantity (gpd) |
|---|---|
| Contaminated Stormwater | 139,670 |
| Industrial Wastewater | 0 |
| Cooling Water (Non contact) | 0 |
| Sanitary Wastewater | 330 |
| Other | 0 |

The permit also specifies reporting, operating and maintenance (O&M), solid waste disposal, emergency notification of hazardous and toxic wastes, and initiation of discharge requirements. The draft permit states that hazardous or toxic materials, as listed by the EPA or as classified by the WDOE, shall not be discharged to the sanitary sewer, and details guidelines to prevent any hazardous material from entering ground or surface waters.

This alternative applies to the standing surface water on Western Processing grounds, neutralized corrosive liquids, and some storm water that has entered previously emptied tanks. If batch testing indicates the water is above discharge limitations, an onsite mobile treatment unit could be used if it has the capability to reduce the parameter concentrations of concern to within applicable discharge limits. Metro would approve a mobile unit based on its past proven reliability, review of its basic block diagram, the type of treatment it performs, and its quality control factors.

CONSTRAINTS (DISCHARGE TO METRO)

Limitations for use of the Metro sewer system are set by parameters within the draft discharge permit. Table 5-4 shows the effluent limitation and monitoring requirements that Metro has set for handling liquids for discharge into its system.

IMPLEMENTATION REQUIREMENTS (DISCHARGE TO METRO)

Onsite

After determining from sample tests that contaminated water from the Western Processing site can be discharged to Metro, a side sewer hook-up permit would have to be obtained from the City of Kent's Public Works Engineering Department. Construction of a new line from Western Processing to the Kent sewer line would be necessary to replace the existing broken 1-1/2 inch line with a larger 4- to 6-inch line. A monitoring station and possibly a mobile treatment unit hook-up will also be needed.

Offsite

No offsite requirements are expected for this alternative once the wastes are within the parameters set by Metro.

CHARACTERIZATION REQUIREMENTS (DISCHARGE TO METRO)

Metro wants the wastewater characterized to assure that it is not classified as dangerous or hazardous by WDOE and EPA standards and to assure that it does not exceed the limits stipulated in the discharge permit.

Table 5-4
EFFLUENT LIMITATIONS
AND MONITORING REQUIREMENTS

| Effluent Limitations | | Monitoring Requirements | |
|---|---|---|---|
| Parameter | Daily Max. | Min. Freq. | Sample Type |
| Total Oils & Grease | 100 mg/l | N/A | N/A |
| pH | Above 5.5 | Prior to batch release | Grab |
| Total Cyanide | 2.0 mg/l | Prior to batch release | Grab |
| Total Halogenated Hydrocarbons (TOX) | 1.0 ppb | Prior to batch release | Grab |
| Naphthalene | 0.5 ppb | Prior to batch release | Grab |
| Benzo(a)pyrene | .01 ppb | Prior to batch release | Grab |
| Fluoranthene | 0.5 ppb | Prior to batch release | Grab |
| Heavy Metals(a) | | | |
| Ag | 1.0 mg/l<br>1.16 lbs/day | Prior to batch release | Grab |
| Cd | 3.0 mg/l<br>3.50 lbs/day | Prior to batch release | Grab |
| Cr | 6.0 mg/l<br>6.99 lbs/day | Prior to batch release | Grab |
| Cu | 3.0 mg/l<br>3.00 lbs/day | Prior to batch release | Grab |
| Ni | 6.0 mg/l<br>6.99 lbs/day | Prior to batch release | Grab |
| Pb | 3.0 mg/l<br>3.00 lbs/day | Prior to batch release | Grab |
| Zn | 5.0 mg/l<br>5.82 lbs/day | Prior to batch release | Grab |

Source: Metro Draft Discharge Permit for Western Processing, 1983.

ENVIRONMENTAL IMPACT (DISCHARGE TO METRO)

As long as the material discharged to Metro complies with the discharge permit, the environmental impacts should be negligible.

REGULATORY REQUIREMENTS (DISCHARGE TO METRO)

Discharge from Western Processing can be expected to meet the same procedures required of all dischargers, with no special exceptions or variations.

POTENTIAL RISK CONSIDERATIONS (DISCHARGE TO METRO)

As long as discharge is sampled and analyzed to meet Metro requirements prior to release of wastewater into the sewer, no short- or long-term risk is anticipated. If any accidental release of waters from the Western Processing site does occur, the level of risk will depend on the type and level of contamination present.

DISCHARGE INTO MILL CREEK

Discharging waste directly into Mill Creek, which runs along the western boundary of the Western Processing site, is one possible alternative for disposing of some of the onsite liquids. In order to discharge any Western Processing waste into Mill Creek, an NPDES permit issued by WDOE must be obtained. The regulations in the permit must cover basic EPA requirements as well as any more stringent requirements that might be imposed by state or local agencies.

DESCRIPTION (DISCHARGE INTO MILL CREEK)

The probable waste types onsite that could be discharged into Mill Creek are the ponded surface stormwater and the stormwater trapped in previously emptied drums. The restrictions imposed by an approved NPDES permit would likely be stringent and the monitoring requirements would require release of precharacterized batches only.

To obtain an NPDES permit an application must be submitted to the WDOE. The application process includes reviewing comments from involved and interested parties, issuance of public notice, possible public hearings, revisions to the draft permit, and possible appeals. The process takes at least 180 days, and probably more if a hearing and appeals are necessary. During the application process the WDOE establishes limitations on water quality standards that must be met under the provisions of the permit. These standards could be derived from the natural conditions of Mill Creek and would restrict discharge of EPA priority pollutants above detection limits. A discharge policy would probably restrict discharge above a 20-to-1 dilution ratio. If on-site treatment were considered as an option, the system would have to be approved and its quality control mechanisms would have to be shown to be failure-proof.

The following requirements would be included in the NPDES permit and would have to be addressed prior to approval:

- Effluent limitations
- Operation and maintenance
- Monitoring
- Spill control plan
- Solids handling
- Sludge removal
- Water quality monitoring of Mill Creek
- Reporting requirements

TECHNICAL FEASIBILITY (DISCHARGE INTO MILL CREEK)

Discharging wastes into Mill Creek under the provisions of an NPDES permit should be a reliable alternative for wastes that can be treated to meet the permit restrictions.

CONSTRAINTS

The low flow of Mill Creek limits the amount of treated or untreated waste that can be discharged. Onsite treatment will require routine monitoring and service. Laboratory analyses will be required for the duration of the discharge.

IMPLEMENTATION REQUIREMENTS (DISCHARGE INTO MILL CREEK)

<u>Onsite</u>

Personnel will be required to sample, monitor, and release the discharge material. Equipment for this process will have to be obtained and maintained. Material might have to be moved to different site locations before final discharge. Operations personnel will need to be well informed of the NPDES permit requirements and be able to evaluate the test and monitoring results.

<u>Offsite</u>

Other than transport of materials and equipment to the site, there are no identifiable offsite requirements for this alternative.

CHARACTERIZATION REQUIREMENTS (DISCHARGE INTO MILL CREEK)

The WDOE will want the discharge material to be fully characterized to assure that it meets the permit requirements.

This will include screening for EPA priority pollutants and other parameters that would be identified during the permit application process.

ENVIRONMENTAL IMPACT (DISCHARGE INTO MILL CREEK)

If NPDES discharge permit requirements are met, the environmental impact will probably be low. The major environmental impact that could result from this alternative would be from an accidental spill. If a spill did occur, the impacts would depend on the amount and type of material spilled. Contamination to the downstream waters, sediments, and aquifer could result and cleanup could be difficult.

REGULATORY REQUIREMENTS (DISCHARGE INTO MILL CREEK)

The NPDES permit application will be reviewed by individuals from several agencies, including Metro and the City of Kent. This process will allow their requirements to be incorporated into the outcome of the application process and permit restrictions if a permit were eventually approved.

The NPDES permit application process is expected to take at least 180 days for approval. This time period could interfere with the use of this alternative for cleanup activities expected in summer 1984.

POTENTIAL RISK CONSIDERATIONS (DISCHARGE TO MILL CREEK)

Because of the nature of the wastes to be treated and discharged, the potential exposure risk of this alternative is high. The risk can be minimized with batch characterization of treated effluent prior to discharge, with proper equipment, and with trained operations personnel.

## INCINERATION/FUEL SOURCE

DESCRIPTION (INCINERATION/FUEL SOURCE)

A large portion of the hazardous materials stored at Western Processing are flammable and could be destroyed by commercial hazardous waste incineration. Hazardous waste incineration is the process of burning the material in a high-temperature furnace with a long residence time. The units are usually equipped with a caustic scrubber to remove particulates and acidic gases.

An alternative to commercial hazardous waste incineration of these wastes would be to burn them and recover their fuel value. Some of these materials could be used as fuel in commercial and industrial processes. There are, however, a number of limitations in the types of acceptable combustion devices available and the suitability of the materials onsite for use as fuels.

TECHNICAL FEASIBILITY (INCINERATION/FUEL SOURCE)

Commercial hazardous waste incinerators can destroy any organics, and are usually designed to handle a wide range of materials with various physical and chemical makeups. For most combustible wastes, incineration is a safe, effective disposal alternative. Unfortunately, there are no commercial hazardous waste incinerators in operation in the Northwestern portion of the United States or mobile incinerators available for use on these types of wastes.

A mobile incinerator is an incinerator that can be moved to a hazardous waste site. The EPA's Municipal Environmental Research Laboratory has been developing a mobile incinerator. Their design consists of a rotary kiln with a solid waste feeder system, a secondary combustion chamber, a quench sump, an air filter to remove particulates, and a scrubber to neutralize acid gases. Wastes are vaporized and partially oxidized at 1800° Fahrenheit in the kiln and are completely oxidized at 2200° Fahrenheit in the secondary combustion chamber.

The incinerator has been used in trial burns of mixtures of fuel oil chlorobenzenes and PCB's. Destruction efficiencies of greater than 99.999999 percent have been obtained for PCB's. Further testing is being done.

Because of the extremely lengthy and difficult permit applications and procedures, the incinerator has not yet been used for any actual hazardous waste application. One of the incinerator's designers believes that the system will be capable of handling all types of wastes except those with a high heavy metal content. A number of incineration companies are in the process of developing their own mobile incinerators to destroy solid hazardous waste.

Although the mobile incinerator is mentioned as a technology, it has been determined that it would not be effective for all of the small volumes of different wastes present at the Western Processing site. It is likely that a pilot test would be required for many of the wastes onsite. The other difficulty in implementing the mobile incinerator is that the incinerator would probably need to go through a stringent approval process at state and local levels before it would be allowed to burn hazardous wastes onsite.

A number of industrial processes burn fuel such as oil, coal, and hog fuel, and could burn some of the flammable materials as a portion of their normal fuel input. These units are not designed to destroy complex hazardous wastes, and usually have lower combustion temperatures and shorter residence times than a hazardous waste incinerator. Salvaged materials, however, such as waste oil and chopped tires, have been successfully used as fuels in industrial processes.

The fuel users that could burn the fuel from the Western Processing site fall into the following categories:

- Cement kilns with electrostatic precipitators (ESP's)
- Hog-fuel-fired boilers with scrubbers, baghouses, or ESP's
- Coal-fired boilers equipped with ESP's
- Nonferrous furnaces with ESP's or baghouses

These were selected because they have the potential to fire oil, and possibly sludges and solids; they are usually large enough that the waste could be burned as a small percentage of the normal firing rate; and they could capture a large portion of any unburned waste, ash, or metals in their control devices.

The technical feasibility of destroying the wastes in the various units listed above varies with the combustibility of the waste (i.e., lower for PCB's, higher for wood pallets) and the combustion efficiency of the unit (higher for cement kilns, lower for hog-fuel boilers).

Since the processes mentioned rely primarily on purchased fuels and are designed to operate continuously, they are not equipped to handle small batches of odd fuels. None of the facilities contacted could handle sludges. Those that are equipped to burn oil can handle only oils of consistent viscosity, and without solids or water. Most facilities are able to handle only homogenous fuel oil (no sludges or solids). They are only interested in "waste oil" type material that can be handled in existing oil burners.

The hog-fuel boiler operators who were contacted either no longer have hogs or have had problems hogging pallets. They also cannot tolerate tramp metal such as large nails or fasteners, which cut their rubber conveyor belts.

CONSTRAINTS (INCINERATION/FUEL SOURCE)

The major constraint to finding candidates to burn the materials as fuel is the great lack of knowledge regarding the nature of the waste. Most of the fuel users contacted said they would be concerned about contaminants in the fuel, and mentioned specific ones that affected their process. Some of those mentioned include chlorides and metals in cement kilns and sodium in a coal-fired boiler. Most of the fuel users have initially determined what would not be acceptable in the fuel. None, however, had developed a specification containing limits on what would be acceptable.

Even though there is no hazardous waste incinerator operating in the Northwest, an ocean-going hazardous waste incinerator ship currently located in Tacoma is attempting to obtain regulatory approval to conduct a test burn and is scheduled to sail for the East Coast in late August to perform the test burn. Currently, various difficult-to-burn liquid hazardous wastes are being accumulated for use in the test burn. The ship cannot process sludges or solids.

This ship could handle all the flammable liquids at the Western Processing site. Liquid flammable wastes that have been characterized as to volume, Btu value, water content, and heavy metal content are acceptable for consideration in this test burn.

IMPLEMENTATION REQUIREMENTS (INCINERATION/FUEL SOURCE)

Onsite

Implementation of the incineration alternative for flammable liquids in tanks is relatively simple. Each tank of liquids would be sampled and tested for the parameters described previously. Liquids that meet requirements could be pumped into tank trucks and hauled to the user. Virtually no additional space would be required for this operation. Time for implementation would be relatively short. Analysis of the liquids would take the most time.

Flammable liquids in drums can also be incinerated; however, collecting, sampling, and analyzing this material would be more difficult than for the liquids stored in tanks. Initially, every drum would have to be opened and sampled to determine which drums contain flammable liquids. When this is determined, the flammable liquids would be tested for mutual compatibility. Compatible liquids would then be pumped into empty tanks onsite. The resulting mixture would be sampled and analyzed for the parameters described previously. If analysis indicates that the liquids are acceptable for fuel use or incineration, they can be pumped into tank trucks and hauled to the user.

More personnel and support equipment would be required for this option. In addition, the waste would be handled more than for the tank liquids. Because this option is so much more complex than for the tank liquids, the time needed for mobilization and demobilization, sampling, and analysis would be much longer. Analysis of the combined liquids would depend on the number of combined liquids generated during this operation.

The amount of space required for this option is that necessary to provide access to all the drums onsite and to segregate these drums according to flammability and compatibility.

A portable laboratory used to support this work would be located outside the site.

The onsite requirement for removing sludge for burning is virtually identical to that needed for liquids. Sampling and handling the sludges may be slightly more difficult than with liquids, and containerizing them could be much more difficult, depending upon their pumping properties. No burners indicated any interest in burning sludges because of perceived operational difficulties.

Removing the solids from the site to be burned would require characterizing the material enough to ensure that it would not hinder the combustion facility operation. The solids would have to be steam cleaned or otherwise processed before a user would accept them, and tramp metal removed. Because of the quantity and nature of the materials onsite, this would take much time to do.

Further, analyses would need to be performed for chlorides, metals and sodium content. As with the sludges, none of the burners contacted showed any interest in burning the solid materials for fuel.

For all materials, any vehicles leaving the site would have to be decontaminated.

<u>Offsite</u>

The offsite requirements for implementation of this option are minimal. Transportation of the waste liquids would be
a user would accept them, and tramp metal removed. Because of the quantity and nature of the materials onsite, this would take much time to do.

Further, analyses would need to be performed for chlorides, metals and sodium content. As with the sludges, none of the burners contacted showed any interest in burning the solid materials for fuel.

For all materials, any vehicles leaving the site would have to be decontaminated.

<u>Offsite</u>

The offsite requirements for implementation of this option are minimal. Transportation of the waste liquids would be by tanker truck. Distances to most potential combustion facilities would be relatively short, thereby reducing the potential for transportation hazards.

Those industrial fuel users that could burn waste oils were only interested in burning them if they would be compatible with existing oil burners. They were reluctant to put the hazardous waste oils in their existing oil tank, preferring to pump directly from the tanker trucks. One burner was concerned that the ash collected from the air pollution control equipment might be classified as a hazardous waste, thereby creating special provisions for testing, manifesting, record keeping, reporting, hauling, and disposal of the ash. None of those contacted indicated they would be willing to make any significant modifications to existing equipment in order to burn the waste "fuel oil."

CHARACTERIZATION REQUIREMENTS (INCINERATION/FUEL SOURCE)

All potential users said they needed to know what was in the material they might burn. They did not want any surprises when they put the material in their combustor. Specifically, they wanted to know volumes, heating value (Btu), viscosity, percent sulfur, chlorine, ash and water, the amount and nature of the trace metals, hazardous components, and any other available information.

ENVIRONMENTAL IMPACT (INCINERATION/FUEL SOURCE)

State, local, and federal air pollution regulations are not specific regarding the large number of toxic and hazardous materials that could be emitted from burning this waste material in an industrial process or a hazardous waste incinerator. In addition, without knowing exactly what is in the waste, and exactly what the combustion conditions are in the selected combustors and control devices, it is impossible to determine what the emissions will be. Test burns are usually conducted to determine emissions and combustion efficiency.

Without criteria and standards for acceptable ambient exposure limits, the effects of the potential emissions are open to debate. Comparisons could be made with NIOSH- and OSHA-allowed levels of toxics in the work place; however, these apply to adult healthy workers for 8 hours-per-day exposure.

REGULATORY REQUIREMENTS (INCINERATION/FUEL SOURCE)

For industrial fuel users, a major concern was the uncertainty of the facility's compliance status with environmental permits during the burn period. Some asked if the ash collected from the burn period would be classified as hazardous. Some stated that their current permits allow only a specific type of fuel to be burned and questioned the ability for the regulatory agencies to waive this during the burn period.

The general feeling among those contacted was that, unless EPA could guarantee that all environmental permits and requirements would be waived for everything connected with burning this material, it was not worth the trouble.

Local regulatory officials contacted said that EPA is the final authority to waive all environmental regulations while this material was being burned. Even if a local agency were to grant a variance from its regulations, EPA still has the final review under provisions of the Clean Air Act. It is not clear whether EPA can waive any of the Clean Air Act or other requirements.

Ocean incineration is required by EPA to achieve a removal efficiency of 99.9999 percent for combustion and destruction. This is only a performance requirement.

When in port, and within the Coast Guard's jurisdiction, ocean incinerators are subject to all local, state, and federal regulations, but only EPA regulates the actual incineration performance in the open sea. The London Dumping Convention is an international agreement to which the United States is a signatory. This agreement regulates the location of burn zones and who uses them.

POTENTIAL RISK CONSIDERATIONS (INCINERATION/FUEL SOURCE)

Most of the industrial fuel users contacted asked if EPA would be willing to take complete responsibility for risks associated with use of the waste. They stated that, unless EPA would accept responsibility, they were not interested in burning the waste fuel.

In discussing this question with EPA, they are not willing to accept all responsibility for the risks. This appears to be a fatal flaw in the potential use of the material as fuel.

## RECYCLE/REUSE

DESCRIPTION (RECYCLE/REUSE)

The Western Processing site contains several waste materials that could be recycled or reused. In many instances, these materials could be removed from the site at no cost. Some materials might even provide a revenue. Solids in this category include pallets, empty drums, battery chips, scrap steel, and zinc oxide, among others. Liquids that potentially could be recycled are primarily "synfuels," which are mixtures of oils and other organics that might be reclaimed.

TECHNICAL FEASIBILITY (RECYCLE/REUSE)

Technically, recycling these materials is feasible; in fact, "nonhazardous" materials of this type are recycled on a routine basis. Many calls identifying Pacific Northwest recyclers were made as part of this study. It was found, for example, that pallets are reused until they are no longer fit for service. The technology for recycling battery chips is well developed. The chips are washed and then the plastic and rubber are separated. The rubber is burned for fuel and the plastic is remolded into useful items. Zinc oxide is treated with sulfuric acid to produce zinc sulfate, which is used as a fertilizer for fruit trees. Mixtures of organic liquids can be separated into their components via fractional distillation. The relatively pure organic liquids can then be reused in industrial processes.

Scrap steel is usually remelted and recycled in the Northwest through the use of electric arc furnaces. In this process the steel is melted at extremely high temperatures through the use of a high-voltage, electric-arc discharge, and particulate emissions from the process are normally controlled by baghouses. There are at least 3 facilities operating in the Seattle area that could melt scrap steel from the Western Processing site. This method has been used for many years, is reliable and efficient, and provides the raw material source for most of the structural steel produced in the Northwest.

CONSTRAINTS (RECYCLE/REUSE)

Each waste material has its own recycling technology and constraints. For example, the pallets must be structurally sound; the zinc oxide must be free of debris and not produce sulfur dioxide when exposed to sulfuric acid; the mixture of organic solvents must be such that the components can be separated in the reclaimer's equipment. There are few technical constraints to melting scrap steel in an electric-arc furnace. Most of the impurities such as zinc and aluminum are oxidized and do not remain in the metal bath. These metals fumes are captured in the baghouse control device. Copper is a problem, and the material to be melted in the furnace would have to be sorted to remove all copper.

While each material has its own set of requirements for successful reuse, they all share one major constraint: no recycler contacted has expressed interest in handling, processing, or reusing material that is contaminated with hazardous materials. In every case, the recycler indicated that testing would have to be done by the EPA to ensure that the material was not contaminated. In addition, the government would have to indemnify the recycler against any and all losses associated with the reuse of the material. In general, the recyclers felt that they would be doing the EPA a favor to take the material, but they were not inclined to do that favor if it exposed them to any liability. In addition, several indicated that they wanted no publicity associated with their taking the material. It was obvious from telephone contacts that these people are sensitive to public perception of their activities.

IMPLEMENTATION REQUIREMENTS (RECYCLE/REUSE)

Onsite

The onsite requirements to implement this disposal alternative are similar to that for disposal at a hazardous waste landfill. All materials to be recycled will have to be sampled and analyzed sufficiently to satisfy the recycler that the material is acceptable for his use. Therefore, onsite equipment will be required to obtain representative samples. This equipment could include materials handling equipment such as backhoes and lift trucks. Cherry pickers may be required to provide access to the tops of some tanks. When materials are identified that are acceptable for recycling, some rearrangement on the site might be necessary to allow access for removal of those materials.

The scrap steel that could be melted would be the steel tanks that contain the waste oils, any of the large structural steel beams in the buildings, the railcars, and the steel drums that contain many of the waste materials. All of this material would have to be completely cleaned of any contaminants. This could be done by either steam cleaning or solvent cleaning. In addition, the drums would have to be crushed or they would cause problems in the arc furnace. The steel drums might have to be cut for easy feeding into the furnace. Long pieces of items such as beams or long sections of the tanks could be hauled to the steel mills and cut with shears at the mill. A crane would be required to load the material onto trucks to take it to the mills.

Offsite

Liquids would be removed from the site in bulk or vacuum tank trailers. Solids would be removed from the site in dump trucks. All vehicles leaving the site will be required to be decontaminated before leaving the Western Processing site. Assuming that the analysis of the materials was adequate, there should be little potential hazard associated with transporting this material to its destination.

No special requirements would be needed at the mill site to handle steel if the materials were cleaned, cut to proper sizes, and the cans crushed. No special characterization of the waste would be necessary other than the complete cleaning and the removal of any copper from the scrap steel.

CHARACTERIZATION REQUIREMENTS (RECYCLE/REUSE)

Ordinarily, characterization requirements might vary from material to material. However, existing data indicate that significant cross-contamination may have occurred among materials onsite. For example, major concerns associated with using zinc oxide might be the lead and cadmium concentration associated with the waste. On this site there is no assurance that the material was not also contaminated with some organic liquids. The recyclers will probably not settle for much less than a complete analysis for most recyclable material on this site.

### ENVIRONMENTAL IMPACT (RECYCLE/REUSE)

In all probability, the environmental impact of this disposal alternative would be insignificant unless the material being recycled contains hazardous materials. For example, if contaminated zinc oxide were converted into zinc sulfate and applied to fruit tree orchards, the orchards could be contaminated from high concentrations of lead in the waste. In addition, any fruit produced in that orchard could end up in the food chain before the contamination was detected. Such impacts would be significant.

No negative environmental impact is expected if the scrap is well cleaned before it is taken to the steel mills. The mill operators would probably request the EPA to waive any special regulatory requirements on the emissions from the handling and processing of the steel and to assume liability for results of the handling and processing of the steel.

### REGULATORY REQUIREMENTS (RECYCLE/REUSE)

The recycling technologies considered in this study already exist and each has its own regulatory requirements. Recycling the material from the Western Processing site should result in no more or different regulatory requirements. A waiver might be required for certain regulations regarding use of waste materials as feedstock in the recycler's process.

### POTENTIAL RISK CONSIDERATIONS (RECYCLE/REUSE)

Because these technologies are well understood and laboratory techniques can detect extremely low levels of contaminants, the risk associated with this disposal alternative is relatively low. Should the analytical techniques fail, allowing contaminated material to be recycled, the risk is significant. As stated above, many of the recyclers will require that the EPA assume any and all liability that might arise from using waste materials from Western Processing.

## DETONATION

### DESCRIPTION (DETONATION)

Detonation is applicable only to wastes that are explosive or potentially reactive. For these wastes, detonation is likely to be the only acceptable disposal alternative.

The only wastes that might be explosive in nature are selected laboratory chemicals. It is not known whether Western Processing's operations included such wastes. Large quantities of explosive wastes probably are not stored on the site, but extreme care must be exercised in handling and disposing even small quantities. Only certified specialists in explosives handling should be allowed to handle the material.

TECHNICAL FEASIBILITY (DETONATION)

When performed by experts in accordance with strict guidelines, detonation is a relatively safe, established method of disposing of explosive materials. Since it is the only method likely to be accepted for disposing of explosives, comparison with alternative technologies is not necessary. For this reason, a detailed review of this technology is not provided.

## CONTAINMENT

DESCRIPTION (CONTAINMENT)

In some instances hazardous materials on the Western Processing site may be stabilized and left on the site. This alternative differs from the no-action option in that the latter option only considers leaving nonhazardous material on the site. Under this alternative the hazardous waste would either be treated to render it nonhazardous and then incorporated into the site closure plan, or would be left untreated for final closure if the contaminants were solids and less hazardous than the underlying soils.

The flue dust onsite is a good example for this alternative. Additional laboratory analysis might determine that the flue dust contains unacceptable concentrations of leachable heavy metals, thereby classifying it as a hazardous material. A containment alternative might include mixing this material with lime to stabilize the metals and render them unleachable. This mixture could then be left on the site as a nonhazardous material.

Other examples are solids in drums, battery chips, and empty drums depending on what contaminants are present.

TECHNICAL FEASIBILITY (CONTAINMENT)

Technically, some of the materials on the site can be treated to render them nonhazardous. This assumes that gross cross-contamination has not occurred in the past. For example, the metals in the flue dust can be stabilized with lime addition, but if volatile organics have been spilled in the flue dust, the contaminants may render the material hazardous and untreatable.

CONSTRAINTS (CONTAINMENT)

Only solid or solidified materials would be adequate for consideration for this alternative. As with the no-action alternative, no liquid material should be considered. In addition, any other materials requiring containerization after treatment would probably not be acceptable for this alternative.

IMPLEMENTATION REQUIREMENTS (CONTAINMENT)

Onsite

The site requirements to implement this alternative would be extensive. Heavy equipment would be required to move large volumes of materials. Staging and treatment areas would have to be cleared. Treatment equipment would probably have to be procured and brought onsite. Areas would have to be established where the stabilized material could be stored until final placement on the site.

Offsite

Since no containment material will be leaving the site, no offsite requirements were identified.

CHARACTERIZATION REQUIREMENTS (CONTAINMENT)

Characterization requirements for any materials considered for this option would be significant. Since there is evidence of gross cross-contamination on the site, any material considered for this option would have to have a complete analysis. In addition, after treatment or stabilization, the material would have to be analyzed again to ensure that the treatment had successfully rendered the material nonhazardous.

ENVIRONMENTAL IMAPCT (CONTAINMENT)

There should be no adverse environmental impacts associated with leaving nonhazardous materials on the site; however, if the characterization of the material is inaccurate or incomplete, especially after treatment, then some environmental degradation could occur.

REGULATORY REQUIREMENTS (CONTAINMENT)

No additional regulatory requirements should result from leaving nonhazardous materials on the site. Containment of identified hazardous materials was not evaluated because Washington Senate House Bill 1438 passed assuring that no dangerous waste will be disposed of in a commercial landfill until at least 1986. It is the current interpretation that the Western Processing site could potentially be classified as a commercial landfill.

POTENTIAL RISK CONSIDERATIONS (CONTAINMENT)

Only material rendered nonhazardous will be contained onsite. Therefore, risk associated with this option should be low. The site will also be controlled so that precipitation could not run off the site.

RETURN TO MANUFACTURER

DESCRIPTION (RETURN TO MANUFACTURER)

For materials onsite that are still in original, unopened, and undamaged containers, it might be possible to return the material or product to its manufacturer. This option is not feasible for wastes that were generated onsite by combining the incoming materials. Specific wastes that might meet this criteria include:

- Flectovarathane wood treatment products located on the pallets near the entrance to the facility

- Drums of foaming agent located near the southeast corner of the facility

TECHNICAL FEASIBILITY (RETURN TO MANUFACTURER)

Because these materials are in unopened containers, sampling has not been undertaken. Without specific knowledge of the reasons for these products being onsite, it is not possible to evaluate completely the technical feasibility of this option.

CONSTRAINTS (RETURN TO MANUFACTURER)

The products onsite might not be usable or treatable by the manufacturer in their current condition.

IMPLEMENTATION REQUIREMENTS (RETURN TO MANUFACTURER)

Onsite

There would be no major onsite facility requirements needed to implement this alternative.

Offsite

There should be no major offsite implementation requirements if the material or product could be jointed to either the manufacturer's product line or normal waste treatment process.

CHARACTERIZATION REQUIREMENTS (RETURN TO MANUFACTURER)

The materials onsite would have to be verified as being in the original manufacturer's containers and that the contents of the drums or containers had not been altered or switched. Extensive chemical characterization is not anticipated or desirable. The cost of extensive testing would adversely affect the economics of this alternative.

ENVIRONMENTAL IMPACT (RETURN TO MANUFACTURER)

The environmental impact of this alternative would be minimal. If the products or materials are usable in their current form, this alternative would reduce the amount of material sent to a hazardous waste facility.

REGULATORY REQUIREMENTS (RETURN TO MANUFACTURER)

The materials would have to be shipped in accord with applicable rules and regulations. The manufacturers would have to agree to treat the materials in accord with all of the applicable laws. A consent agreement would have to be negotiated with the EPA.

POTENTIAL RISK CONSIDERATIONS (RETURN TO MANUFACTURER)

The manufacturer would be responsible for risks associated with handling the materials and for satisfying regulations.

RELEASE TO RESPONSIBLE PARTY

DESCRIPTION (RELEASE TO RESPONSIBLE PARTY)

For wastes whose responsible parties can be clearly identified, it might be possible to negotiate a release agreement for the responsible party to remove and treat the waste at his or her own expense. The advantage of this alternative is that the burden of disposal or reuse of the wastes is placed directly on the responsible party. Specific wastes that this alternative might apply to are:

- Synfuel wastes
- Flue dust
- Battery chips
- Printing inks

TECHNICAL FEASIBILITY (RELEASE TO RESPONSIBLE PARTY)

The release alternative has no significant technical feasibility issues.

CONSTRAINTS (RELEASE TO RESPONSIBLE PARTY)

The implementation of this alternative depends on the ability to correlate wastes with responsible parties. The responsible parties must be willing to take the wastes and dispose of them in an approved treatment facility. The necessary legal agreement must be reached to permit the removal of the wastes.

IMPLEMENTATION REQUIREMENTS (RELEASE TO RESPONSIBLE PARTY)

Onsite

There are not major onsite treatment requirements needed for this alternative. Loading facilities and support facilities would be needed.

Offsite

The responsible parties would need to arrange for suitable treatment, storage, and disposal facilities.

CHARACTERIZATION REQUIREMENTS (RELEASE TO RESPONSIBLE PARTY)

A waste analysis would probably be needed by the responsible party to verify that the waste is the same material that was originally shipped to the site.

ENVIRONMENTAL IMPACT (RELEASE TO RESPONSIBLE PARTY)

Environmental impacts for this alternative would be similar to those of other disposal alternatives. The actual disposal location could differ from that used by a central contractor.

REGULATORY REQUIREMENTS (RELEASE TO RESPONSIBLE PARTY)

The regulatory requirements would be similar to those for disposal actions at the site by a single cleanup contractor.

POTENTIAL RISK CONSIDERATIONS (RELEASE TO RESPONSIBLE PARTY)

Under this alternative, disposal risks would be the responsibility of the party receiving the waste.

NO ACTION

DESCRIPTION (NO ACTION)

An alternative considered for all waste materials on the Western Processing site was that of "no action." In this alternative, only minimal action would be taken. For example, tall stacks of drums might be restacked to reduce the threat of falling material. This option is not acceptable for the hazardous materials on the site. Instances where this alternative might be viable include:

- When the material may have some useful future purpose
- When the material may not present a long-term danger to the environment
- When the material can be disposed of or handled as part of the long-term site closure activities

Specific wastes that might meet the above requirements include:

- Flue dust
- Wood pallets
- Tires
- Concrete blocks
- Demolition debris

TECHNICAL FEASIBILITY (NO ACTION)

Once any material has been determined to be free of any hazardous contaminants, there is no technical reason why that material cannot be left onsite. Doing so might affect the other cleanup activities on the site and might not fit with the long-term goals associated with site cleanup. With potential time constraints of cleanup of the entire site surface during summer 1984, it is possible to consider the above listed waste for temporary storage onsite for cleanup activities at a later time. The final determination as to leaving waste onsite will depend on further waste analysis to identify potential contaminant hazard.

CONSTRAINTS (NO ACTION)

The no action alternative would probably not be appropriate for hazardous wastes. It might take time and significant money to analyze wastes for hazardous contaminants. Materials probably could not be left onsite unless they were determined to be nonhazardous.

Some wastes, regardless of their hazardous nature, were deemed unacceptable for this alternative. No-action was deemed to be an unacceptable strategy for any type of liquid waste, because of the high probability that additional surface water or groundwater pollution eventually will occur if liquids are allowed to remain onsite. Likewise, no-action is not advisable for any type of drummed or tanked materials, whether they be solid, liquid, or sludges, because of the already poor condition of many of the drums and the additional deterioration that is certain to happen with time.

In addition, accidents or vandalism of the drums or tanks could occur. If drummed or tanked materials spill on the ground as a result of container failure, surface and groundwater pollution will undoubtedly occur. For this reason, the no-action alternative was not deemed appropriate for consideration with any liquids or with tanked or drummed materials.

Leaving nonhazardous materials onsite might obstruct the implementation of remedial actions for onsite hazardous wastes.

IMPLEMENTATION REQUIREMENTS (NO ACTION)

Onsite

There should be no significant onsite requirements associated with this alternative. Ultimately, all hazardous materials on the site will be either stabilized or removed. Surface runon and runoff will be controlled to prevent contaminated water from leaving the site in an uncontrolled fashion. These provisions should be adequate for the no-action alternative.

Offsite

No offsite requirements were identified.

CHARACTERIZATION REQUIREMENTS (NO ACTION)

The characterization requirements necessary to establish the innocuous nature of any material onsite could be extensive. Because of the potential of cross-contamination around the site, any material being considered for this option would probably have to be analyzed for all possible hazardous contaminants. In many cases (for example, flue dust), just obtaining a representative sample could be difficult, time consuming, and expensive.

ENVIRONMENTAL IMPACTS (NO ACTION)

No adverse environmental impacts are associated with leaving nonhazardous materials on the site. However, if the characterization of the material is inaccurate or incomplete and some of these materials are contaminated with hazardous wastes, then some environmental degradation could occur. It is expected that all site runoff and runon will be controlled so that this type of contamination would probably not leave the site unless it percolated into the groundwater. If the ultimate disposition of the site includes an impermeable liner on the surface, the chance of such percolation occurring will be reduced.

REGULATORY REQUIREMENTS (NO ACTION)

No additional regulatory requirements should result from leaving nonhazardous materials on the site.

POTENTIAL RISK CONSIDERATIONS (NO ACTION)

Assuming that nonhazardous materials are left onsite in a safe manner, there should be virtually no risk associated with this option. Even if an analytical error occurs, allowing some contaminated material to remain onsite, the risk would be minor.

## Section 6
## SCREENING OF ALTERNATIVES

The remedial alternatives listed in Section 4 were given an intensive, two-step screening to arrive at a short list of alternatives suitable for detailed evaluation. The screening process involved a comparative assessment of the alternatives based on the known physical and chemical waste characteristics of each waste (Section 3) and the suitability of the alternatives discussed in Section 5. In addition, considerable judgment, assumptions, and qualitative assessment were required to compensate for the data limitations described in Sections 3, 4, and 5.

### METHODOLOGY

The screening methodology was developed and the screening performed by senior CH2M HILL chemical engineers familiar with hazardous waste management. The methods and results were reviewed by the FFS project manager, project engineer, hazardous waste specialists, and economists. The results were quantified to the extent allowed by the data limitations, and consensus was achieved on the results.

The methodology was selected to accommodate the large number and variety of waste types and the likelihood of extensive cross-contamination of most (if not all) wastes as a result of past operating practices at Western Processing. An example is the isopropyl alcohol (IPA) mixture. Because IPA is not a hazardous material and is easily biodegradable, untreated discharge to the Metro sewer system seems to be an attractive disposal option. Unfortunately, it is not known who the potential responsible party is, what chemicals were originally in the fluid, how it was handled onsite, or whether it was processed or mixed and redrummed. The material might or might not meet pretreatment standards, be hazardous, be treatable, contain more than one liquid (or solid) phase, or be uniform across all drums. Therefore, the material must be characterized, then bulked, before it can be determined if discharge to Metro is a viable alternative. Even if this were done, some pretreatment would probably be required (otherwise the material would probably have been discharged years ago). Pretreatment requires testing, design, and mobilization of facilities, all of which take considerable time and money.

Because of circumstances similar to these for most waste types, the alternatives were screened on two levels. First, alternatives for all waste types were qualitatively screened according to 14 criteria grouped into engineering, economic, environmental, and institutional categories, as required by the National Contingency Plan (Table 6-1). Other common screening criteria not listed, such as land availability, ease of construction, acceptability to the public, and impacts on receiving water wastes or ambient air, generally are implicit in the listed criteria. The institutional considerations mainly affect the potential for a timely response in implementing a remedial action.

Table 6-1
INITIAL SCREENING CRITERIA

| Criterion | Definition |
|---|---|
| ENGINEERING | |
| 1. Technical Feasibility | Consistent with physical and chemical laws, applicable to site location and conditions, able to treat generic wastes and achieve disposal consistent with applicable regulations |
| 2. Demonstrated and Reliable | Used successfully elsewhere to treat or dispose of similar wastes; history of reliable operation and reasonable availability |
| 3. Consistent with Project Needs | Suitable for waste types and volumes, site conditions, project goals, and constraints |
| 4. Safety | Does not unduly jeopardize personnel during operation and disposal, on or offsite |
| 5. Schedule and Logistics | Consistent with current schedule (July bidding, site cleared by year end); transportation and special conditions manageable |

Table 6-1 (continued)

| Criterion | Definition |
|---|---|
| ECONOMIC | |
| 1. Capital Cost | Cost of fixed (not mobile) onsite facilities necessary to implement alternative; initial charge of chemicals (if required) |
| 2. Operating and Maintenance Costs | Cost of sampling and analysis, labor, materials, chemicals, catalysts, utilities, transportation, rented equipment, and disposer or recycler fees |
| 3. Total Cost | Capital plus O&M cost (Due to the short project duration, present worth analysis is not meaningful) |
| ENVIRONMENTAL | |
| 1. Short-Term Environmental Impact | Impacts caused by the clean up action on both natural and man-made environments over the near term (0-10 years). Includes impacts caused by the wastes, residuals, containers, byproducts, and contaminated materials |
| 2. Long-Term Environmental Impact | Impacts on both natural and man-made environments anytime after 10 years |
| 3. Public Health Effects | Impacts on the health and welfare of anyone coming into primary or secondary contact to the wastes, residuals, containers, or byproducts, due to the cleanup action either onsite, in-transit, at |

Table 6-1 (continued)

| Criterion | Definition |
|---|---|
| | offsite disposers, or by migration of contaminated material. |
| INSTITUTIONAL | |
| 1. Agency or Disposer Approvals | Relative ease of obtaining necessary approvals from pertinent regulatory agencies and/or reasonable contracts from disposers |
| 2. Regulatory and Risk Concerns | Likelihood of obtaining regulatory approvals that will not change with time; immediate or long-term risk potential |

In the initial screening, each alternative was rated as very positive, positive, neutral, negative, or very negative for each criterion, and an overall ranking was made. Alternatives rated overall as negative or very negative were dropped from further consideration. This first screening was not quantified by assigning weightings and points and summing the results because the resulting point totals would have implied greater precision than allowed by the basic data.

The second level of screening was a more quantitative effort that involved a rough order-of-magnitude cost and schedule analysis of the remaining alternatives. During this screening, it became apparent that many of the remedial alternatives cannot be completely assessed for feasibility until the wastes are characterized. The amount of information needed about a particular waste varies for each remedial alternative. Therefore, estimates were made of the incremental costs for developing the detailed information (sampling, analysis, testing, and negotiation) essential to the evaluation and the costs for implementing the alternative. Since disposal of any hazardous waste material is feasible at a hazardous waste landfill, the costs were then compared to the expense of hauling the material to a hazardous waste landfill. In the schedule analysis, the time required for implementation was compared to the time available.

## SCREENING RESULTS

The results after both levels of screening are shown in Table 6-2. The detailed results of these two screening activities are shown in Appendix D.

Only the alternatives with an overall ranking of ++, +, or o survived the first level of screening.

In the second screening, it was determined in many cases that obtaining the additional information required for recycle/reuse alternatives or disposal in a municipal landfill costs more than disposal of the materials as hazardous waste. In many cases, potential savings versus offsite disposal in a hazardous waste landfill did not justify the degree of sampling, analysis, testing, and negotiation required, particularly considering the risk that such analysis could prove the waste to be hazardous or untreatable anyway. In a few cases where large quantities were involved, the costs of additional sampling and analysis appeared to be worth the expense.

The rationale and results for each level of screening are discussed below by waste type.

## CORROSIVE LIQUIDS

### First Screening

Two major groups of corrosives have been identified: corrosives in drums and corrosive wastewater in tanks. If the metal and organic concentrations in these liquids are not too high, onsite neutralization and discharge to the nearby Metro sewer is probably the most attractive alternative. The technology has been demonstrated, and construction or mobilization of neutralization equipment onsite would probably not pose undue schedule or cost restrictions. The technology is consistent with project needs and would probably be acceptable from an environmental standpoint. However, the limited records of past operating practices onsite suggest that these liquids could contain a variety of metals and organics that require significant treatment. If so, negotiations with Metro could be more difficult.

In this case, removal to an offsite treatment facility would perhaps be more feasible if the waste can be fully characterized and a treater can be identified within the time constraints. While the treatment and disposal would not be under EPA's direct control, this alternative would still have environmental and regulatory acceptability with the right treater.

Table 6-2
REMEDIAL ALTERNATIVES REMAINING AFTER SECOND SCREENING

| Waste Type | Alternative | Comments |
|---|---|---|
| A. Corrosive Liquids | 1. Onsite treatment and discharge to Metro | Potentially feasible only as part of overall aqueous waste cleanup |
| | 2. Haul to offsite treatment facility | Potentially feasible only as part of overall aqueous waste cleanup |
| | 3. Haul to HW landfill | Probably not economical or necessary |
| B. Sludge from corrosive tanks | 1. Haul to HW landfill | |
| | 2. Solidify and haul to HW landfill | Only feasible if dry contaminated solidification agent is available onsite |
| C. Isopropyl alcohol mixture | 1. Onsite treatment and discharge to Metro | Potentially feasible only as part of overall aqueous waste cleanup |
| | 2. Haul to offsite treatment facility | Potentially feasible only as part of overall aqueous waste cleanup |
| | 3. Haul to HW landfill | |
| D. Flue Dust | 1. Haul to HW landfill | |
| | 2. Onsite use as solidification agent, haul to HW landfill | Only feasible if the material is dry and should be disposed of in a HW facility |
| | 3. Onsite use in final site closure | Only feasible if closure plans include onsite containment of potentially hazardous wastes |
| | 4. Release to potential responsible party | Negotiations could become protracted and extend schedule |
| E. Battery chips | 1. Offsite HW landfill | |
| | 2. Offsite recycle/reclaim | Attractive |
| | 3. Release to potential responsible party | Negotiations could become protracted |
| F. Zinc oxide | 1. Haul to HW landfill | |

Table 6-2 (cont.)

| Waste Type | Alternative | Comments |
|---|---|---|
| G. Foaming agent | 1. Haul to HW landfill | |
| | 2. Return to manufacturer | Negotiations could become protracted |
| | 3. Release to potential responsible party | Negotiations could become protracted |
| H. Wood pallets | 1. Haul to HW landfill | |
| I. Printing inks, tars, oils, and greases | 1. Haul to HW landfill | |
| | 2. Release to potential responsible party | Negotiations could become protracted |
| J. Tires | 1. Clean and sell/give away | Attractive |
| | 2. Steam clean, haul to municipal landfill | |
| | 3. Haul to HW landfill | |
| K. Nail coating | 1. Haul to HW landfill | |
| L. Unknowns | 1. Haul to HW landfill | |
| | 2. Other technology, depending on characterization | More information is needed before other technologies can be found |
| M. Transformers | 1. Haul to HW landfill | Suitable technology will depend upon the PCB content of oils |
| | 2. Offsite incineration | |
| | 3. Onsite or offsite treatment of liquids and recycle casings | |
| | 4. Onsite drain and flush, incinerate liquids; haul casings to municipal landfill | |
| N. "Synfuels" a) 60-weight bunker oil | 1. Haul to HW landfill | |
| | 2. Reuse as fuel | Assumes that oils have heating value and are uncontaminated, and a user can be found |

Table 6-2 (cont.)

| Waste Type | | Alternative | Comments |
|---|---|---|---|
| | b) Oils with high arsenic content | 1. Dilute and recycle for pressure creosoting | Assumes that oils are not otherwise contaminated and a user can be found |
| | | 2. Haul to HW landfill | |
| | c) Mixed liquids | 1. Same as (a) | |
| | d) Oil with methylene chloride | 1. Offsite treatment and recycle | Assumes that oils are not otherwise contaminated and a user can be found |
| | | 2. Haul to HW landfill | |
| | e) Caustic liquids | 1. Reuse | Only attractive if uncontaminated |
| | | 2. Haul to HW landfill | |
| O. | Gypsum pile | 1. Haul to HW landfill | |
| | | 2. Haul to municipal landfill | Unlikely to satisfy landfill disposal criteria |
| P. | Fluids in gypsum pile | 1. Onsite treatment and discharge to Metro | Potentially feasible only as part of overall aqueous waste cleanup |
| | | 2. Offsite treatment | Potentially feasible only as part of overall aqueous waste cleanup |
| | | 3. Haul to HW landfill | |
| Q. | Sludge from bottoms of tanks | 1. Haul to HW landfill | |
| R. | Tanks and scrap metal | 1. Haul to HW landfill | Probably not necessary or economical |
| | | 2. Steam clean, sell whole and/or cut and sell as scrap | Attractive. Could have logistics problems |
| S. | Ponded water and decon water from operations | 1. Treat and discharge to Metro | Potentially feasible only as part of overall aqueous waste cleanup |
| | | 2. Offsite treatment | Potentially feasible only as part of overall aqueous waste cleanup |
| | | 3. Haul to HW landfill | |

Table 6-2 (cont.)

| Waste Type | Alternative | Comments |
|---|---|---|
| T. Nonrecyclable solvents | 1. Haul to HW landfill | |
| | 2. Solidify and haul to HW landfill | Uneconomical unless dry contaminated solidification agent available onsite |
| U. Crystallized solids | 1. Haul to HW landfill | |
| | 2. Others, depending on nature of material | More information needed before other alternatives can be identified |
| V. Laboratory chemicals (explosives must be detonated) | 1. Haul to HW landfill | |
| W. Pesticides | 1. Haul to HW landfill | |
| X. Paint waste, varnishes, and stains | 1. Haul to HW landfill | |
| Y. Misc. flammable fluids | 1. Haul to HW landfill | |
| | 2. Solidify and haul to HW landfill | Uneconomical unless dry contaminated solidification agent available onsite |
| Z. Concrete blocks | 1. Steam clean and use onsite in final closure | Depends on final closure plans |
| | 2. Haul to HW landfill | |
| AA. Demolition debris | 1. Haul to HW landfill | |
| | 2. Steam clean and recycle | Applicable to metallic tools and equipment only |
| | 3. Steam clean and haul to municipal landfill | Applicable to metallic tools and equipment only |
| BB. Empty drums | 1. Haul to HW landfill as is | |
| | 2. Haul to HW landfill, crushed onsite | |
| | 3. Recycle | |

Onsite treatment and discharge to Mill Creek would face significantly greater obstacles regarding discharge criteria, treatment, and permitting than the previous two alternatives. This option has virtually no redeeming values for this project.

If technical feasibility, cost, or schedule precludes any of the above alternatives, removal of the material to an approved hazardous waste landfill is always possible, at greater cost. Attempts to reduce this cost by onsite evaporation will face serious schedule and cost penalties, and it is likely that volatile organics will be present, which will result in serious regulatory barriers.

In summary, onsite treatment and discharge to Mill Creek and onsite evaporation do not have a sufficient number of positive features to justify further evaluation. The other three alternatives were carried forward to the second screening.

Second Screening

For this waste by itself, the apparent cost savings due to onsite or offsite treatment and discharge to Metro versus disposal at a hazardous waste landfill are not sufficient to justify the additional work involved. However, unless a particular waste proves to contain untreatable constituents, it can be combined with large volumes of other aqueous wastes (e.g., decon water) and treated for discharge in a cost-effective manner. Therefore, offsite disposal at a hazardous waste landfill was dropped from consideration. Both onsite and offsite treatment and discharge to Metro should be retained until further characterization is done.

SLUDGE FROM CORROSIVE TANKS

First Screening

This sludge is both voluminous and poorly characterized. Consequently, removal to an offsite hazardous waste landfill in either semisolid or solid form appears feasible, acceptable, and achievable. Attempts to reduce offsite disposal costs by onsite drying or filtration will face formidable technical, schedule, and cost barriers. The material will be highly corrosive and might contain volatile organics. Handling and feeding will be difficult and will entail significant capital and operating costs.

Although solidification of a material prior to hazardous waste landfill disposal might be necessary depending upon characteristics, there is no need to go to the next level of technology and encapsulate the material. Encapsulation is a state-of-the-art technology that has little practical use in this case and imposes high operating costs and schedule delays. The waste would still be designated as hazardous.

If the material does not contain sufficient organics or metals to cause it to be declared hazardous following neutralization, it could potentially be bulked, neutralized, solidified, and disposed of in a municipal landfill. Although this could result in cost savings, the time and expense required for adequate characterization, mixing, treatment, and negotiations would be substantial. Therefore, this alternative was eliminated because of handling problems, technical uncertainties, and institutional barriers.

In summary, the municipal landfill and encapsulation alternatives were eliminated and the rest carried forward to the second level of screening.

<u>Second Screening</u>

Solidifying the sludge onsite and hauling it to a hazardous waste landfill would be more expensive than hauling it as is to a hazardous waste landfill. This solidifying alternative could be more attractive if dry, lightweight solidifying agents are available onsite, assuming that these solidifying agents would also have to be disposed of at a hazardous waste landfill. The cost of onsite drying is not offset by the associated reduced costs for transportation and disposal.

In summary, an offsite hazardous waste landfill is the most attractive alternative, with the possibility of onsite solidification as an alternative only if appropriate solidifying agents are available onsite.

ISOPROPYL ALCOHOL MIXTURE

<u>First Screening</u>

This waste has disposal alternatives and constraints similar to those for the corrosive liquids. If the waste were to contain only IPA and water (see discussion in Methodology section, above), discharge to Metro without treatment would be the preferred and easily negotiable alternative. If minor contamination is found, discharge to Metro with minimal treatment would still be possible. However, if other contamination is found to be more severe (e.g., metals or polycyclic aromatic hydrocarbons), hauling the material to an offsite treater or a hazardous waste landfill must be considered.

Onsite treatment and discharge to Mill Creek has many disadvantages and should be ruled out. The material is too dilute to have any value for reuse, and if it is so contaminated that it cannot be discharged to Metro, hauling to a municipal landfill would also be out of the question. Onsite evaporation to reduce hazardous waste landfill costs was considered and similarly rejected due to substantial capital and operating costs and doubtful regulatory approval. Therefore, only discharge to Metro, offsite treatment, and hazardous waste landfill alternatives were carried forward into further screening.

Second Screening

It is assumed that discharge to Metro would require onsite treatment. The screening rationale is very similar to that for the corrosive liquids: both onsite and offsite treatment of all aqueous wastes will require further evaluation. It is unlikely that hauling these aqueous liquids to a hazardous waste landfill would be the most cost-effective way to handle the waste.

FLUE DUST

First Screening

The flue dust is poorly characterized and is probably from a variety of metals-producing industries. Although a sample failed initial toxicity tests by the Department of Ecology, it is possible that some portions of the material would not fail the tests and could be handled like flyash. However, it is also possible that hazardous liquid or solid materials were dumped on or mixed into the flue dust over the years. The material might or might not be homogeneous. Therefore, extensive characterization will be necessary for any alternative besides hauling to a hazardous waste landfill.

Disposal at power plants was ruled out because of the probability that the material is significantly different from coal flyash and because the owners have reacted negatively. With sufficient characterization, the flue dust could be used onsite for containment material as part of site closure, although there could be problems with long-term environmental effects, permits, and legal issues.

Probably the best use for the material will be as a solidification agent for hazardous liquids and sludges prior to their disposal at an offsite hazardous waste landfill. If enough dry flue dust is available, this practice allows simultaneous disposal of flue dust and liquid wastes, offers maximum material utilization, and has no significant environmental or institutional barriers. However, it appears that the material has become partially saturated with rainfall, which could prevent use of this material as a solidification agent. Because it appears possible to identify the potential responsible parties, negotiated return of the material is also a possibility.

In summary, the municipal landfill alternative and disposal at power plants were dropped at this point and the rest carried forward for further analysis.

Second Screening

Sale for reuse appears highly unlikely because of hazardous contamination and institutional problems. The extensive characterization and negotiation needed will consume at least 30 percent of the potential cost savings, and the risk of uncovering a fatal flaw is great. Onsite use for solidification does not offer much economic benefit and is expensive to demonstrate. Onsite use in final site closure offers significant savings and, depending upon closure options, should be evaluated in detail, along with offsite hazardous waste landfill disposal and return to the potential responsible party.

BATTERY CHIPS

First Screening

Spent batteries are routinely reclaimed by separating the lead, plastic, and rubber constituents for reuse, remolding, and burning as fuel supplements in hog fuel boilers. Three local recyclers have expressed interest in the material. However, typical of other materials onsite, initial investigations have detected unusual levels of volatile organics over the waste battery chip piles, indicating that other materials might have been mixed in or spilled on the pile.

Additional characterization will be necessary before the material is moved offsite for reclamation. Because of the presence of these volatiles and the likely lead contamination, as indicated in a sample taken by the WDOE, disposal at a municipal landfill received negative marks in all criteria and was dismissed at this point. Offsite incineration will most likely occur as a subset of offsite reclamation because of the need to wash the material to remove the lead and other contaminants before burning. Release to the potential responsible party is also possible here. If all else fails, the material is acceptable at hazardous waste landfills, at high cost.

In summary, only the municipal landfill alternative was eliminated from further evaluation.

Second Screening

The best disposal option for the battery chips is reclamation and reuse. This represents a potential savings of between $100,000 and $200,000 over disposal in a hazardous waste landfill. The battery chip pile should be analyzed further to ensure identification of hazardous compounds other than those that are routinely handled by battery recyclers.

Hazardous waste landfill is still a feasible, but expensive, alternative. Incineration (as is) will require an approved hazardous waste incinerator. Because such a facility does not exist nearby, incineration will be more expensive than a nearby hazardous waste landfill, and was eliminated. Release to the potential responsible party should be evaluated in light of schedule constraints.

ZINC OXIDE

First Screening

As with the flue dust, a number of local recyclers have expressed interest in the large amount of zinc oxide onsite. These recyclers either plan for or have access to processes that can remove the tramp material, such as ferrous metals, and react with sulfuric acid to form zinc sulfate for use as a fruit tree fumigant. They also demand significant amounts of characterization, offsite storage, and a guarantee from EPA that they will be indemnified if the material is found to jeopardize fruit-growing operations. Although this will impose serious logistical problems, the potential cost savings are significant enough to warrant further investigation of the recycle options.

In its present form, the material is a compact solid and will not be effective as an onsite solidification agent. Finally, as a last resort, the material could be hauled offsite for disposal in a hazardous waste landfill.

In summary, the recycle and hazardous waste landfill alternatives were judged to warrant further consideration.

Second Screening

The large number of drums of solidified zinc oxide waste will require extensive, costly sampling and analysis to allow recycle. Therefore, the recycle alternative was eliminated as uneconomical. This alternative would also take considerably more time than the schedule allows. Disposal in a hazardous waste landfill is the only surviving alternative.

FOAMING AGENT

First Screening

The only information available on the nature of this waste indicates that it is probably liquid and contains "foaming agent." Treatment and discharge to Mill Creek has no redeeming factors and was discarded as an alternative. The material probably is far too concentrated for discharge to Metro. Without further characterization, it was not possible to eliminate disposal at a municipal landfill or sale for reuse. However, these alternatives will require considerable characterization and negotiation, and approvals could be difficult to obtain. The material is also suitable for offsite hazardous waste landfill disposal. Intact drum labels could allow return to the manufacturer or the potential responsible party.

In summary, discharge to Mill Creek or Metro was eliminated from further consideration, and the rest were analyzed further.

Second Screening

Because of the small volumes involved, costs for extensive drum handling, sampling, and analysis become significant. Municipal landfill disposal was eliminated because of the costs required to solidify and characterize the material. Sale for reuse was also eliminated because of the excessive costs associated with ensuring product quality. The only remaining alternatives are offsite hazardous waste landfill disposal and return to the manufacturer or potential responsible party (if schedule constraints allow).

WOOD PALLETS

First Screening

Even wood pallets represent a serious problem on the widely contaminated Western Processing site. The absorptive pallets could have been exposed to a number of wastes over time and become heavily contaminated. Heavy organics and metals would probably not be removable by steam cleaning. Therefore, disposal of contaminated pallets in a municipal landfill or reuse can be ruled out on the basis of feasibility and environmental and institutional barriers. At least one pallet recycler has expressed interest in taking uncontaminated pallets, if EPA ensures freedom from contamination.

Another alternative, incineration, would destroy both the material and the contamination, but in order to incinerate materials onsite, the pallets would have to be hogged or chipped (an operation with serious logistical problems on a site such as this), and a suitable mobile incinerator would have to be found. To date, no such unit has been found.

Offsite incineration in a large industrial hog fuel boiler is perhaps the best general solution. However, of the three owners contacted, one would require complete disassembly and removal of all nails, another was not interested without blanket EPA guarantees and indemnification, and a third cited previous severe problems with firing and conveying pallets and ash. Thus this alternative, although an attractive long-term solution, will encounter serious logistical and approval barriers.

The use of the chipped material onsite as a solidification agent would have merit, but the logistics and cost of a disassembly and chipping operation could well be insurmountable. Finally, as with most of the wastes, offsite disposal of the pallets at a hazardous waste landfill would be acceptable.

In summary, the onsite incineration and municipal landfill alternatives were eliminated in the initial screening.

Second Screening

Offsite incineration and use onsite as a solidification agent were both eliminated in the second screening because of the costs required to clean and/or test the pallets and the associated handling and disassembly costs. For example, to use the pallets onsite as a solidification agent, they would have to be chipped. To run the pallets through a chipper, the nails must be manually removed from the pallets. The labor costs of removing the nails while wearing protective equipment far outweigh the costs of sending the materials to a hazardous waste landfill. Therefore, the only remaining alternative is disposal at a hazardous waste landfill.

PRINTING INKS, TARS, OILS, AND GREASES

First Screening

Although these wastes have some value for reuse or fuel supplements, they are distributed across such a large number of drums that characterization will be expensive and time consuming. Because the potential responsible party has been tentatively identified, negotiated release may be feasible. Another alternative will be to dispose of the material in a hazardous waste incinerator. One firm has expressed interest in using the material for a test burn.

If incineration is not feasible, offsite disposal in a hazardous waste landfill in either solidified or liquid form presents the only other viable alternative. Onsite evaporation and disposal at municipal landfills will both be prohibited by the extent of volatile organic contamination present.

Second Screening

Because a land or ocean-based hazardous waste incinerator must be used, offsite incineration was eliminated as more expensive than an offsite hazardous waste landfill. Release to the potential responsible party should also be investigated.

TIRES

First Screening

Like the wood pallets, waste tires have been distributed across the site and have come in contact with many contaminants. However, tires are more amenable to steam cleaning than are pallets, so that recycling is a feasible option. One recycler has expressed serious interest in the tires providing they are steam cleaned and stacked onsite. This could be done in a way that ensures thorough removal of all surface contamination and allows identification of tires heavily contaminated with solvents that may pose a risk of hazardous exposure to the recycler. The recycler shreds the tires and sells the shredded material as fuel supplement for hog fuel boilers. The scrap steel and fiber is disposed in a municipal landfill.

Likewise, steam cleaning and disposal at a municipal landfill appears feasible, but this alternative is not as economically attractive as the recycling option. Offsite incineration is also feasible, but probably would only occur as part of the recycling option because no local incinerators were identified that can process whole tires. Offsite disposal in a hazardous waste landfill is feasible but expensive.

In summary, all of the alternatives were retained for further screening.

Second Screening

If the tires can be sufficiently steam cleaned, it would be more cost-effective to clean them and either give them away or send them to a municipal landfill than it would be to send them to a hazardous waste landfill. Offsite incineration was eliminated because of the high costs and schedule constraints associated with locating and negotiating with a suitable incinerator.

NAIL COATING

First Screening

This is one of the least characterized materials onsite and could be organic, aqueous, or polymeric in nature. The material is probably either a corrosive inorganic aqueous solution with high metal content, or a concentrated, viscous organic blend. In either case, treatment and discharge to either Metro or Mill Creek or disposal in a municipal landfill do not appear to be feasible or acceptable and were ruled out at this level of screening.

Recycling is possible, but the amount of work entailed in characterization and negotiation will be formidable. Likewise, significant preliminary work must be conducted before offsite incineration can be evaluated.

In summary, because the characterization is so incomplete, recycle, offsite incineration, and hazardous waste landfilling deserve further screening.

Second Screening

Because of the small volumes involved, the costs associated with adequately characterizing the drums for reuse are greater than the cost of disposal at a hazardous waste landfill. Incineration as a hazardous waste is also more expensive. Therefore, the only remaining alternative for nail coating is offsite disposal at a hazardous waste landfill.

UNKNOWNS

The wide variety of possible physical and chemical characteristics of this material makes identification of alternatives and screening impossible at this point, other than to assume that disposal at an offsite hazardous waste landfill is probably feasible and expensive.

TRANSFORMERS

First Screening

The three large transformers onsite can be handled like any other PCB-contaminated transformers in the area:

- Disposal in an offsite hazardous waste landfill
- Offsite incineration
- Offsite treatment of liquid, followed by casing disposal at a hazardous waste landfill

These alternatives will depend on the level of PCB contamination. PCB characterization should be relatively straightforward. If the liquid in the transformers does not contain PCB's or has levels less than 50 ppm, the options available are:

- Offsite treatment and recycling of the copper casings and use of the fluid for fuel

- Hauling the casings to a municipal landfill and use of the fluid for fuel.

Appropriate disposal techniques should be easily implementable within the project schedule.

Second Screening

The second screening eliminated the treat and recycle alternative for transformers because of the small quantity of transformers onsite.

"SYNFUELS"

(a) Bunker Oil

First Screening. Although reuse as fuel appears attractive, owners of industrial boilers and fired heaters have not expressed interest in this material. Recyclers have shown some interest and could probably accept material with PCB levels less than 50 ppm. Until further testing is done, the recycling option is questionable.

The material would be suitable for destruction in commercial hazardous waste incinerators. At-sea incinerators preparing to conduct test burns could use this material. Use of a hazardous waste incinerator will depend on additional laboratory analysis and user or agency approvals.

In any event, the oil can be disposed of, at an expected higher cost, in an offsite hazardous waste landfill.

Second Screening. The incineration alternative was eliminated because the cost for incinerating liquids at either an ocean or land-based hazardous waste incinerator is significantly higher than at an offsite hazardous waste landfill. The greatest potential benefit comes from reusing the synfuels as a fuel. Before the "synfuels" could actually be used as a fuel, a minimum of two tests per tank would probably be required. The other remaining alternative is disposal in a hazardous waste landfill.

(b) Oils with High Arsenic Content

First Screening. Because heavy oils and arsenic are used for certain pressure creosoting processes, the potential for recycling exists here, subject to the same logistical and institutional barriers discussed in (a) above. The offsite incineration and offsite hazardous waste landfill options are also similar to (a). Treatment for arsenic removal, on the other hand, was ruled out as technically unreliable, expensive, and difficult to implement.

Second Screening. As explained above, incineration was eliminated as an alternative because of cost. Recycling these oils for use as pressure creosoting material might be a possibility. Further characterization is justifiable based on the estimated cost savings from reusing these oils over disposing of them in a hazardous waste landfill. Another feasible alternative for these oils is disposal in a hazardous waste landfill.

(c) Mixed Liquids

A group of tanks onsite contain liquids that have been mixed with different fluids from other tanks. Until further characterization is available, the waste should be handled in the same manner as the bunker oil.

(d) Oil With Methylene Chloride

First Screening. Some of the tanks onsite were tested for methylene chloride. Methylene chloride is in the class of compounds known as chlorinated organics. Methylene chloride presence was tested by the emergency response team during onsite activities in 1983 because it was identified as being a widespread contaminant in the groundwater. Other chlorinated organics also may be present, but further analyses are needed to determine their presence. Chlorinated organics are important compounds because of the potential problems they present for treatment and disposal. The compounds are usually carcinogenic at low levels and highly mobile when disposed of, and the chlorine is not destroyed by incineration.

Existing data do not indicate whether this material is primarily aqueous or oily in nature. If aqueous, onsite treatment and discharge to Metro, as for the corrosive liquids and IPA mixture, could apply. However, this alternative is probably precluded by the wide variety of likely contaminants and the resulting constraints imposed by the necessary sampling, testing, negotiations, and facilities mobilization.

If the material is oily, which is more likely, three alternatives were identified. The material could be acceptable to an onsite treater or recycler, depending upon its characteristics. Offsite incineration is another possibility, using a land-based or at-sea incineration unit. The use of these incinerators will depend on their having obtained either a permit to operate under federal regulation or having received approval to conduct a test burn for regulatory evaluation of incinerator efficiency characterization. The level and degree of detailed characterization needed will be less than that needed from an average industrial boiler operator who might agree to reuse such wastes. If schedule or logistics prove too great, disposal in an offsite hazardous waste landfill is also possible, at significantly increased cost.

In summary, the discharge to Metro alternative was eliminated, and the rest were included in the second screening.

Second Screening. Assuming that a land- or ocean-based hazardous waste incinerator must be used, offsite incineration was eliminated because incineration is more expansive than an offsite hazardous waste landfill. The recycling option should be retained pending further characterization.

(e) Caustic Liquids

Like the other mixtures in tanks, very little is known about the physical or chemical properties of this material. In the best case, the material could be a homogeneous liquid with low organic and metals contamination and sufficient causticity to allow reuse as a neutralizing agent onsite or offsite. In the worst (and more likely) case, contamination and nonhomogeneity will preclude reuse. Therefore, the material was screened similarly to the oil with methylene chloride, Item d.

GYPSUM PILE

First Screening

This large pile of material, rather than simply gypsum, appears to be a very nonhomogeneous mass of sludges and granular solids with strong indications of liquid spills and other contamination throughout. The material must be treated as RCRA hazardous until a significant amount of characterization is done to prove otherwise. If analysis indicates that the material is nonhazardous, then it could possibly be suitable for disposal in a municipal landfill. Based on current knowledge of the source of this material, it is highly unlikely that this material could be acceptable for municipal landfill disposal. Reuse as fill offsite was ruled out on the basis of feasibility, schedule, likelihood of severe contamination, and institutional barriers. The most likely alternative will be offsite disposal in a hazardous waste landfill, although the municipal landfill option was carried farther for cost screening.

Second Screening

Both offsite hazardous waste landfill and municipal landfill remained in the analysis after second-level screening. The potential cost savings of disposing of the gypsum in a municipal landfill versus a hazardous waste landfill is in excess of $200,000. Better characterization is needed to verify suitability for disposal in a municipal landfill.

FLUIDS IN THE GYPSUM PILE

First Screening

This material consists primarily of contaminated rainwater and other liquids in the pile. Although the extent of contamination is unknown, discharge to Mill Creek even after treatment was ruled out as inconsistent with project needs, expensive, and encountering serious logistical environmental and institutional barriers.

Discharge to Metro without further treatment was likewise ruled out. Pretreatment and discharge to the Metro sewer system could be feasible, depending upon the characteristics of the wastewater, especially if it could be treated in combination with other onsite aqueous wastes. Likewise, offsite treatment is worth further evaluation.

Offsite incineration is economically feasible only if an at-sea incinerator needed the material enough to offer a substantially reduced price. The material is probably too dilute to provide such an incentive. In the absence of any other feasible disposal method, the material probably would be acceptable at an offsite hazardous waste landfill.

In summary, discharge to Mill Creek, untreated discharge to Metro, and offsite incineration were eliminated, and the other alternatives were carried forward for further screening.

Second Screening

Both onsite and offsite treatment offer a potential economic benefit over disposal in a hazardous waste landfill, particularly when combined with relatively large volumes of other aqueous wastes such as ponded water and decon water.

SLUDGE FROM BOTTOM OF TANKS

First Screening

The first five remedial alternatives for this waste type are identical to the five alternatives for the sludge from the corrosive tanks and have been screened similarly.

Because this material could have significant organic content, offsite incineration was also examined. However, no incinerators were identified in the Northwest that could handle either drummed or bulked sludges. Therefore, this alternative was eliminated because of substantial sampling and analysis requirements and insurmountable technical and logistical problems.

Second Screening

Onsite drying and/or filtration were eliminated as more costly than disposal in a hazardous waste facility. Unless a suitable solidification agent is already onsite that also requires disposal in a hazardous waste landfill, onsite solidification and disposal in a hazardous waste landfill would be more expensive than to haul it as is.

TANKS AND SCRAP STEEL

First Screening

Although this material has probably been as widely exposed to contamination as the tires, it is more amenable to steam cleaning. Because local recyclers have expressed an interest in whole tanks, cut-up tanks, and scrap steel, this is probably the preferred disposal alternative. The cleaned material could also be hauled to a municipal landfill.

Dirty material could probably be hauled as is to a hazardous waste landfill. Hazardous waste landfill costs could be reduced by cutting the material up (without prior cleaning), but the risk of fire or explosion was considered excessive. The steam clean, cut, and haul to hazardous waste landfill alternative was also discarded, primarily on the basis of cost.

Second Screening

Selling steam-cleaned material as scrap metal or whole tanks is economically preferable to disposal in a hazardous waste landfill. The steam clean, cut, and haul alternative was eliminated as uneconomical (particularly when compared to reuse).

PONDED WATER AND DECON WATER FROM ONSITE OPERATIONS

First Screening

Recent analyses indicate the ponded water onsite has significant contamination from chlorinated organics and some PAH's. An equal or greater amount of decon water is expected to accumulate over the course of cleanup operations. Until this water is collected and further characterized, the extent of pretreatment required for Metro discharge standards cannot be fully estimated. Because significant organic and inorganic contamination is also likely, this alternative probably will face schedule constraints due to required characterization, testing, negotiation, and treatment plant mobilization. However, because of the large volumes involved, onsite treatment might be justifiable, especially if treatment can be applied to all aqueous wastes onsite.

Offsite treatment might be more attractive, because treaters close to the site are already set up to handle oily wastes with metals and other organic contamination. Disposal at an offsite hazardous waste landfill is feasible, but extremely expensive.

Because volumes could be substantial, all of these alternatives were carried forward into the next level of screening.

Second Screening

Assuming that at least 500,000 gallons of dilute wastewater are involved, either onsite or offsite treatment would save between $100,000 and $200,000 over disposal in a hazardous waste landfill. Therefore, offsite hazardous waste landfill disposal was eliminated.

NONRECYCLABLE SOLVENTS IN DRUMS

First Screening

As with the other uncharacterized drummed liquids onsite, the cost and logistics of characterizing this material enough to allow incineration or recycling will probably be prohibitive. However, an at-sea test burn might offer price reductions. Therefore, the offsite recycling option was eliminated on the basis of logistics and acceptability, and the other options were retained for further screening.

Second Screening

Both ocean and land-based hazardous waste incinerators are more expensive than offsite hazardous waste disposal facilities, and were therefore eliminated. Solidification is cost-effective only if sufficient amounts of contaminated materials are already onsite that can solidify the liquids. The other remaining alternative is offsite hazardous waste disposal.

CRYSTALLIZED SOLIDS

First Screening

For these large volumes of essentially uncharacterized material, disposal in a municipal landfill was eliminated because of the effort required to characterize the waste and negotiate with the landfill operators and regulatory agencies. Disposal at an offsite hazardous waste landfill appears feasible. Other options are possible, including use as a solidification agent onsite or use in site closure activities, depending on the characteristics of the material.

### Second Screening

More information is needed before second-level screening would be useful.

## LABORATORY CHEMICALS

### First Screening

Because of the possibility of cross contamination resulting from storage with the other hazardous materials onsite, the "donate to local organization" and "return to manufacturer" options were eliminated based on feasibility, logistics, and acceptability. Offsite incineration is a possibility but cannot be justified for the small volumes and variety of chemicals involved. Disposal in an offsite hazardous waste landfill is acceptable and, although expensive on a unit cost basis, does not have a large total cost. On the basis of label information, a few of the chemicals might not be acceptable at a hazardous waste landfill and will have to be detonated either onsite or offsite by qualified explosives personnel.

In summary, only hauling to a hazardous waste landfill and detonation were retained for further consideration.

### Second Screening

Second-level screening did not change the remedial alternatives for the laboratory chemicals.

## PESTICIDES

### First Screening

Both offsite incineration and offsite landfill disposal at approved hazardous waste facilities appear feasible and were carried forward into cost analysis.

### Second Screening

Second-level screening eliminated offsite incineration as an alternative because the cost of incineration (as a hazardous waste) is almost double the cost of disposal in a hazardous waste landfill.

## PAINT WASTE, VARNISHES, AND STAINS

### First Screening

When paint products from industrial facilities can be characterized as to origin and storage history, they are routinely reclaimed and recycled throughout the Northwest.

However, the potential for cross contamination at Western Processing has been great. A considerable amount of characterization must be done before recycling is permitted. Because the wastes are stored in thousands of drums and cans, characterization will be both costly and time consuming. The costs may be minimized if the drums and cans are in transportable condition at the time of surface cleanup, thus reducing the need to repackage. Even with this factor, the cost of handling and recycling exceeds the benefit from transportable drums. Therefore, recycling was eliminated as an option.

Disposal in a municipal landfill was eliminated for similar reasons. The offsite hazardous waste landfill and incinerator alternatives were carried forward into further evaluation.

Second Screening

This screening eliminated offsite incineration as an alternative because the cost of incineration (as a hazardous waste) is almost double the cost of disposal in a hazardous waste landfill.

FLAMMABLE FLUIDS

First Screening

The screening for these fluids was similar to that for paint wastes: namely, the logistical, schedule, and acceptability constraints probably preclude recycle options. Offsite incineration and hazardous waste landfills were carried forward for further cost analysis. Onsite solidification prior to offsite hazardous waste landfill disposal is a method for potential cost reduction and will also be evaluated further.

Second Screening

Offsite incineration for the miscellaneous flammable fluids was eliminated for the same reasons as given for the pesticides and paint wastes. Solidification of the flammable fluids would be cost-effective only if onsite contaminated materials were used as the solidification agent. The most likely remaining alternative is offsite hazardous waste landfill disposal.

CONCRETE BLOCKS

First Screening

Because concrete blocks have been used and reused for various containment structures for many years all over the site, they have experienced perhaps the most significant waste exposure of any onsite building material. The blocks are porous and will be more difficult to steam clean than either the rubber tires or structural steel. There will be no assurance that hazardous materials have been removed after cleaning. Consequently, municipal landfills and offsite reuse were eliminated as disposal options. Depending on final closure plans the blocks could possibly be steam cleaned and buried onsite. If this proves infeasible, they appear to be acceptable for disposal in offsite hazardous waste landfills.

Second Screening

The cost to steam clean and adequately sample the blocks for disposal onsite appears to be less than disposal of the blocks in a hazardous waste landfill. This alternative will require slightly more time to allow for analysis and potential negotiation. The other remaining alternative is disposal in an offsite hazardous waste landfill. Both of these alternatives merit further evaluation.

DEMOLITION DEBRIS

First Screening

Porous material such as lumber, wallboard, ceilings, benches, cardboard, and bags is considered to have contamination similar to but not as severe as the wood pallets. Because contaminated materials such as these are expected to resist steam cleaning, the recycle and municipal landfill options were eliminated because of feasibility, logistics, and environmental and institutional acceptability. As with the pallets, although offsite incineration appears potentially attractive, no one has been found who would consider accepting the material. Steam cleaning and offsite burial is an option that is certain to face institutional problems regarding acceptability. However, for purposes of comparison, this alternative plus offsite hazardous waste landfill and incineration alternatives were carried forward into further screening.

Plastic or metallic materials (e.g., tools, fiberglass-reinforced plastic (FRP), roofing, shelves, pumps, and forklifts) should be amenable to steam cleaning and reuse or disposal in a municipal landfill. While the reuse market is not as strong as for tanks and scrap steel, the procedures and incentives are similar. Miscellaneous contaminated materials such as plastic sheeting will probably not be economical to clean and should be disposed of in hazardous waste landfills.

### Second Screening

Incineration was eliminated as a feasible alternative for the porous building debris because of logistical difficulties and costs associated with cleaning and sampling and the lack of interest in the fuel value of the material. Offsite hazardous waste incineration would not be economical because of high transportation and incineration costs. Burial onsite was ruled out, as for the wood pallets. The only remaining alternative is offsite disposal in a hazardous waste landfill.

Metallic and plastic materials can be cleaned and reused and should be investigated on an individual basis. While work benches and FRP roofing probably are not valuable enough to justify cleaning, equipment such as pumps, battery chippers, or cars might be. Therefore reuse, municipal landfills, and hazardous waste landfills are all potentially feasible for these wastes.

## EMPTY DRUMS

### First Screening

Empty drums are not as easy to clean as tanks because of their size. Because residuals are difficult to remove entirely, municipal landfills were ruled out. Drum recyclers, on the other hand, will accept drums for scrap or resale if residuals are less than one inch deep. Recyclers are more accustomed to cleaning operations and have access to drum crushers and the reuse market. Although onsite crushers are not available, crushing with bulldozers has been practiced successfully. Hazardous waste landfills will accept drums either crushed or as is.

### Second Screening

Some drums might be recycled if the residuals are less than one inch deep. Hauling crushed drums to a hazardous waste landfill will be more economical than hauling whole drums. The steam clean options do not appear to be logistically and economically justifiable.

APPENDIX A

**RCRA HAZARD CLASSIFICATION CODES OF ONSITE DRUMS**

EA0171

## DRUMS REMAINING ON SITE - WESTERN PROCESSING, INC.

| LOC | SAMPLE | PHASE | DESCRIPTION | PCB INFO | HNU (PPM) | PH | CLASS | CORR | FLAM | H2O REACT | CHLORIDE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | 00051 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | |
| S | 00052 | | SOLID | < 50 | 0 | 0 | NC | 0 | 0 | 0 | |
| 12 | 00053 | | ACIDIC | < 50 | 0 | 4 | NC | 0 | 0 | 0 | |
| 12 | 00054 | | ACIDIC | < 50 | 0 | 7 | NC | 0 | 0 | 0 | |
| 12 | 00057 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | |
| 12 | 00058 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | |
| 12 | 00059 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00060 | | CAUSTIC | < 50 | 0 | 9 | NC | 0 | 0 | 0 | 0 |
| 12 | 00061 | | CAUSTIC | < 50 | 70 | 10 | NC | 0 | 0 | 0 | 0 |
| S | 00063 | | SOLID | < 50 | 30 | 0 | C | 0 | 1 | 0 | |
| 12 | 00064 | | CAUSTIC | < 50 | 10 | 9 | NC | 0 | 0 | 0 | 0 |
| 12 | 00065 | | ACIDIC | < 50 | 0 | 7 | NC | 0 | 0 | 0 | 0 |
| 12 | 00068 | | ACIDIC | < 50 | 7 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00069 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00070 | | ACIDIC | < 50 | 120 | 4 | NC | 0 | 0 | 0 | 0 |
| 12 | 00071 | | ACIDIC | < 50 | 9 | 7 | NC | 0 | 0 | 0 | 0 |
| 12 | 00072 | | ACIDIC | < 50 | 6 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00073 | | ACIDIC | < 50 | 10 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00074 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00075 | | CAUSTIC | < 50 | 0 | 9 | NC | 0 | 0 | 0 | 0 |
| 12 | 00076 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00077 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00078 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00079 | | ACIDIC | < 50 | 0 | 7 | NC | 0 | 0 | 0 | 0 |
| 12 | 00080 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00081 | | ACIDIC | < 50 | 0 | 7 | NC | 0 | 0 | 0 | 0 |
| 12 | 00082 | | ACIDIC | < 50 | 0 | 7 | NC | 0 | 0 | 0 | 0 |
| 12 | 00083 | | ACIDIC | < 50 | 0 | 7 | NC | 0 | 0 | 0 | 0 |
| 12 | 00084 | | ACIDIC | < 50 | 0 | 7 | NC | 0 | 0 | 0 | 0 |
| 12 | 00085 | | ACIDIC | < 50 | 0 | 5 | NC | 0 | 0 | 0 | 0 |
| S | 00086 | | SOLID | < 50 | 30 | 0 | NC | | 0 | 0 | |
| 12 | 00087 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| S | 00088 | | SOLID | < 50 | 200 | 6 | C | 0 | 1 | 0 | 0 |
| 12 | 00089 | | CAUSTIC | < 50 | 0 | 9 | NC | 0 | 0 | 0 | 0 |
| 12 | 00090 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00091 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00092 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00093 | | ACIDIC | < 50 | 5 | 4 | NC | 0 | 0 | 0 | 0 |
| S | 00094 | | SOLID | < 50 | 0 | 0 | NC | | 0 | 0 | |
| 12 | 00095 | | ACIDIC | < 50 | 0 | 7 | NC | 0 | 0 | 0 | 0 |
| 12 | 00096 | | ACIDIC | < 50 | 12 | 5 | NC | 0 | 0 | 0 | 0 |
| S | 00098 | | SOLID | < 50 | 50 | 0 | NC | | 0 | 0 | |
| S | 00099 | | SOLID | < 50 | 300 | 0 | C | | 1 | 0 | |
| S | 00100 | | SOLID | < 50 | 15 | 0 | C | | 1 | 0 | |
| S | 00101 | | SOLID | < 50 | 0 | 0 | NC | | 0 | 0 | |
| S | 00102 | | SOLID-MUD | < 50 | 0 | 0 | C | | 1 | 0 | |
| S | 00103 | | SOLID | < 50 | 0 | 0 | NC | | 0 | 0 | |
| 12 | 00104 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00105 | | CAUSTIC | < 50 | 5 | 9 | NC | 0 | 0 | 0 | 0 |

Source: TAT Activities Report, Compile Chemical Data, Western Processing Cleanup, Kent, Washington. Prepared for EPA by Roy F. Weston, Inc., et al.

DRUMS REMAINING ON SITE - WESTERN PROCESSING, INC.

| LOC | SAMPLE | PHASE | DESCRIPTION | PCB INFO | HNU (PPM) | PH | CLASS | CORR | FLAM | H2O REACT | CHLORIDE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | 00001 | | | < 50 | 0 | 7 | NC | 0 | 0 | 0 | 0 |
| 12 | 00002 | | | < 50 | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00003 | | | < 50 | 0 | 6 | NC | 0 | 0 | 0 | |
| 12 | 00005 | | | < 50 | 0 | 5 | NC | 0 | 0 | 0 | |
| 12 | 00006 | | | < 50 | 0 | 6 | NC | 0 | 0 | 0 | |
| 12 | 00007 | | | < 50 | 0 | 6 | NC | 0 | 0 | 0 | |
| 12 | 00008 | | | < 50 | 20 | 9 | NC | 0 | 0 | 0 | |
| 12 | 00009 | | | < 50 | 20 | 11 | NC | 0 | 0 | 0 | |
| 12 | 00010 | | | < 50 | 0 | 6 | NC | 0 | 0 | 0 | |
| 12 | 00011 | | | < 50 | 5 | 6 | NC | 0 | 0 | 0 | |
| S | 00012 | V-12 | VISCOUS | < 50 | 0 | 4 | NC | 0 | 0 | 0 | |
| S | 00013 | V-12 | VISCOUS | < 50 | 0 | 6 | NC | 0 | 0 | 0 | |
| 12 | 00014 | | | < 50 | 300 | 4 | NC | 0 | 0 | 0 | |
| 12 | 00015 | | | < 50 | 0 | 6 | NC | 0 | 0 | 0 | |
| 12 | 00016 | | | < 50 | 0 | 7 | NC | 0 | 0 | 0 | |
| 12 | 00017 | | ACIDIC | < 50 | 0 | 8 | NC | 0 | 0 | 0 | |
| 12 | 00018 | | ACIDIC | < 50 | 0 | 5 | NC | 0 | 0 | 0 | |
| 12 | 00019 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | |
| 12 | 00020 | | CAUSTIC | < 50 | 0 | 10 | NC | 0 | 0 | 0 | |
| 12 | 00021 | | ACIDIC | < 50 | 10 | 5 | NC | 0 | 0 | 0 | |
| 12 | 00022 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | |
| 12 | 00023 | | ACIDIC | < 50 | 0 | 5 | NC | 0 | 0 | 0 | |
| 12 | 00024 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | |
| 12 | 00025 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | |
| 12 | 00026 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | |
| 12 | 00027 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | |
| 12 | 00028 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | |
| 12 | 00029 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | |
| 12 | 00030 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | |
| 12 | 00031 | | CAUSTIC | < 50 | 0 | 10 | NC | 0 | 0 | 0 | |
| 12 | 00032 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | |
| 12 | 00033 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | |
| 12 | 00034 | | ACIDIC | < 50 | 0 | 7 | NC | 0 | 0 | 0 | |
| 12 | 00035 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | |
| 12 | 00036 | | CAUSTIC | < 50 | 10 | 9 | NC | 0 | 0 | 0 | |
| 12 | 00037 | | CAUSTIC | < 50 | 7 | 9 | NC | 0 | 0 | 0 | |
| 12 | 00038 | | ACIDIC | < 50 | 0 | 7 | NC | 0 | 0 | 0 | |
| 12 | 00039 | | CAUSTIC | < 50 | 5 | 9 | NC | 0 | 0 | 0 | |
| 12 | 00040 | | ACIDIC | < 50 | 0 | 7 | NC | 0 | 0 | 0 | |
| 12 | 00041 | | ACIDIC | < 50 | 8 | 6 | NC | 0 | 0 | 0 | |
| 12 | 00042 | | ACIDIC | < 50 | 0 | 4 | NC | 0 | 0 | 0 | |
| 12 | 00043 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | |
| 12 | 00044 | | ACIDIC | < 50 | 0 | 5 | NC | 0 | 0 | 0 | |
| 12 | 00045 | | CAUSTIC | < 50 | 10 | 9 | NC | 0 | 0 | 0 | |
| 12 | 00046 | | CAUSTIC | < 50 | 0 | 9 | NC | 0 | 0 | 0 | |
| 12 | 00047 | | CAUSTIC | < 50 | 8 | 9 | NC | 0 | 0 | 0 | |
| 12 | 00048 | | ACIDIC | < 50 | 15 | 4 | NC | 0 | 0 | 0 | |
| 12 | 00049 | | ACIDIC | < 50 | 0 | 3 | NC | 0 | 0 | 0 | |
| 12 | 00050 | | ACIDIC | < 50 | 5 | 6 | NC | 0 | 0 | 0 | |

DRUMS REMAINING ON SITE - WESTERN PROCESSING, INC.

| LOC | SAMPLE | PHASE | DESCRIPTION | PCB INFO | HNU (PPM) | PH | CLASS | CORR | FLAM | H2O REACT | CHLORIDE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | 00106 | | CAUSTIC | < 50 | 0 | 9 | NC | 0 | 0 | 0 | 0 |
| 12 | 00107 | | ACIDIC | < 50 | 10 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00108 | | ACIDIC | < 50 | 50 | 7 | NC | 0 | 0 | 0 | 0 |
| 12 | 00109 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00110 | | ACIDIC | < 50 | 0 | 5 | NC | 0 | 0 | 0 | 0 |
| S | 00111 | | SOLID | < 50 | 0 | | NC | | 0 | 0 | |
| S | 00112 | | SOLID-MUD | < 50 | 5000 | | C | | 1 | 0 | |
| S | 00113 | | SOLID | < 50 | 0 | | NC | | 0 | 0 | |
| S | 00114 | | SOLID | < 50 | 20 | | NC | | 0 | 0 | |
| S | 00115 | | SOLID-MUD | < 50 | 0 | | NC | | 0 | 0 | |
| S | 00116 | | SOLID | < 50 | 0 | | C | | 1 | 0 | |
| 12 | 00117 | | ACIDIC | < 50 | 0 | 5 | NC | 0 | 0 | 0 | |
| S | 00118 | | SOLID | < 50 | 5 | | NC | | 0 | 0 | |
| 12 | 00119 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| S | 00120 | | SOLID | < 50 | 0 | | C | | 1 | 0 | |
| S | 00121 | | SOLID | < 50 | 0 | 0 | NC | 0 | 0 | 0 | |
| S | 00122 | V ORG | VISCOUS | < 50 | 0 | | C | 0 | 1 | 0 | |
| 12 | 00123 | AQ | ACID | | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| S | 00124 | | SOLID | < 50 | 5 | | NC | | 0 | 0 | |
| S | 00125 | | SOLID | < 50 | 10 | | SOLID | | 0 | 0 | |
| S | 00126 | | SOLID | < 50 | 15 | 9 | C | 0 | 1 | 0 | |
| S | 00127 | | SOLID | < 50 | 15 | 9 | C | 0 | 1 | 0 | |
| S | 00128 | | SOLID | < 50 | 35 | 9 | C | 0 | 1 | 0 | |
| S | 00129 | | SOLID | < 50 | 0 | | C | | 1 | 0 | |
| S | 00130 | | SOLID | < 50 | 200 | | C | | 1 | 0 | |
| 12 | 00131 | AQ | ACID | < 50 | 0 | 6 | NC | 0 | 0 | 0 | |
| S | 00132 | | SOLID | < 50 | | | | | | | |
| S | 00133 | | SOLID | < 50 | | | | | | | |
| S | 00134 | | SOLID | < 50 | | | | | | | |
| S | 00135 | | SOLID | < 50 | 5 | | C | | 1 | 0 | |
| S | 00136 | | SOLID-HARD | < 50 | | | | | | | |
| S | 00137 | | SOLID | < 50 | 10 | | C | | 1 | 0 | |
| S | 00138 | | SOLID | < 50 | 10 | | C | | 1 | 0 | |
| S | 00139 | | SOLID | < 50 | 5 | | C | | 1 | 0 | |
| S | 00140 | | SOLID | < 50 | 20 | | C | | 1 | 0 | |
| S | 00141 | | SOLID | < 50 | 100 | 6 | C | 0 | 1 | 0 | 0 |
| 12 | 00142 | | ACIDIC | < 50 | 7 | 6 | NC | 0 | 0 | 0 | 0 |
| S | 00143 | | SOLID | < 50 | 20 | | C | | 1 | 0 | |
| S | 00144 | | SOLID | < 50 | | | | | | | |
| S | 00145 | | SOLID | < 50 | 250 | | C | 0 | 1 | 0 | |
| S | 00146 | | SOLID | < 50 | 10 | | NC | 0 | 0 | 0 | |
| S | 00147 | | SOLID | < 50 | 6 | | C | 0 | 1 | 0 | |
| S | 00148 | | SOLID | < 50 | 70 | | C | | 1 | 0 | |
| S | 00149 | | SOLID | < 50 | 5 | | C | 0 | 1 | 0 | |
| S | 00150 | | SOLID | < 50 | 10 | | C | 0 | 1 | 0 | |
| S | 00151 | | SOLID | < 50 | 10 | | C | 0 | 1 | 0 | |
| S | 00152 | | SOLID | < 50 | 15 | | C | 0 | 1 | 0 | |
| S | 00153 | | SOLID | < 50 | 20 | | NC | 0 | 0 | 0 | |
| S | 00154 | | SOLID | < 50 | 0 | | | | | | |

<u>DRUMS REMAINING ON SITE - WESTERN PROCESSING, INC.</u>

| LOC | SAMPLE | PHASE | DESCRIPTION | PCB INFO | HNU (PPM) | PH | CLASS | CORR | FLAM | H2O REACT | CHLORIDE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S | 00155 | | SOLID | < 50 | 20 | | C | | 1 | 0 | |
| S | 00156 | | SOLID | < 50 | 20 | | C | | 1 | 0 | |
| S | 00157 | | SOLID | < 50 | 25 | | C | | 1 | 0 | |
| S | 00158 | | SOLID | < 50 | 100 | | NC | | 0 | 0 | |
| S | 00159 | | SOLID | < 50 | 0 | | | | | | |
| S | 00160 | | SOLID | < 50 | 10 | | C | | 1 | 0 | |
| S | 00161 | | SOLID | < 50 | 30 | | C | | 1 | 0 | |
| S | 00162 | | SOLID | < 50 | 20 | | C | | 1 | 0 | |
| S | 00163 | | SOLID | < 50 | 2 | | | | | | |
| S | 00164 | | SOLID | < 50 | 180 | | C | | 1 | 0 | |
| S | 00165 | | SOLID | < 50 | 250 | | C | | 1 | 0 | |
| S | 00166 | | SOLID | < 50 | 60 | | C | | 1 | 0 | |
| S | 00167 | | SOLID | < 50 | 0 | | | | | | |
| S | 00168 | | SOLID | < 50 | 20 | | NC | | 0 | 0 | 0 |
| S | 00169 | | SOLID | < 50 | 0 | | | | | | |
| S | 00170 | | SOLID | < 50 | 4 | | | | | | |
| S | 00171 | | SOLID | < 50 | 2 | | | | | | |
| S | 00172 | | SOLID | < 50 | 50 | | NC | | 0 | 0 | |
| S | 00173 | | SOLID | < 50 | 0 | | | | | | |
| S | 00174 | | SOLID | < 50 | 20 | | NC | | 0 | 0 | |
| S | 00175 | | SOLID | < 50 | 5 | | NC | | 0 | 0 | |
| S | 00176 | | SOLID | < 50 | 20 | | NC | | 0 | 0 | |
| S | 00177 | | SOLID | < 50 | 0 | | | | | | |
| S | 00178 | | SOLID | < 50 | 110 | | NC | | 0 | 0 | |
| 12 | 00196 | | ACIDIC | < 50 | 40 | 3 | NC | 0 | 0 | 0 | 0 |
| 12 | 00215 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| 5 | 00223 | | ACIDIC | | 0 | 1 | NC | 1 | 0 | 1 | 0 |
| 9 | 00228 | | ACIDIC | < 50 | 0 | 4 | NC | 0 | 0 | 1 | 0 |
| 6 | 00229 | | ACIDIC | < 50 | 0 | 1 | NC | 1 | 0 | 1 | 0 |
| 5 | 00244 | AQ | ACIDIC | | 0 | 1 | NC | 1 | 0 | | 0 |
| 5 | 00271 | | ACIDIC | < 50 | 0 | 1 | NC | 1 | 0 | 1 | 0 |
| 6 | 00282 | AQ | ACIDIC | | 0 | 1 | NC | 1 | 0 | 1 | 0 |
| 9 | 00322 | | ACIDIC | < 50 | 40 | 6 | NC | 0 | 0 | 1 | 0 |
| 9 | 00323 | | ACIDIC | < 50 | 40 | 6 | NC | 0 | 0 | 1 | 0 |
| 10 | 00325 | | ACIDIC | < 50 | 300 | 6 | C | 0 | 1 | 0 | 0 |
| 9 | 00332 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 1 | 0 |
| MT | 00340 | MT | | | | | | | | | |
| 12 | 00360 | AQ | CAUSTIC | | 0 | 11 | NC | 0 | 0 | 0 | 0 |
| 12 | 00365 | AQ | ACIDIC | | 0 | 7 | NC | 0 | 0 | 0 | 0 |
| 9 | 00366 | AQ | ACIDIC | | 0 | 7 | NC | 0 | 0 | 1 | 0 |
| 10 | 00367 | | ACIDIC | < 50 | 0 | 6 | C | 0 | 1 | 0 | 0 |
| 6 | 00368 | AQ | ACIDIC | | 0 | 1 | NC | 1 | 0 | 1 | 0 |
| 6 | 00371 | AQ | ACIDIC | | 0 | 1 | NC | 1 | 0 | 1 | 0 |
| 6 | 00373 | AQ | ACIDIC | | 0 | 1 | NC | 1 | 0 | 1 | 0 |
| S | 00374 | | SOLID | < 50 | 0 | | NC | | 0 | 0 | 0 |
| 6 | 00375 | AQ | ACIDIC | | 0 | 1 | NC | 1 | 0 | 1 | 0 |
| 6 | 00376 | AQ | ACIDIC | | 0 | 1 | NC | 1 | 0 | 1 | 0 |
| 6 | 00378 | | | < 50 | 40 | 1 | | 1 | 1 | 1 | 0 |
| 12 | 00385 | AQ | CAUSTIC | | 0 | 11 | NC | 0 | 0 | 0 | 0 |

DRUMS REMAINING ON SITE - WESTERN PROCESSING, INC.

| LOC | SAMPLE | PHASE | DESCRIPTION | PCB INFO | HNU (PPM) | PH | CLASS | CORR | FLAM | H2O REACT | CHLORIDE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S | 00388 | | SOLID | < 50 | 0 | | SOLID | | 0 | 0 | 0 |
| 12 | 00389 | AQ | CAUSTIC | | 0 | 11 | NC | 0 | 0 | 0 | 0 |
| 6 | 00393 | AQ | ACIDIC | | 0 | 1 | NC | 1 | 0 | 1 | 0 |
| 7 | 00394 | AQ | CAUSTIC | | 0 | 14 | NC | 1 | 0 | 1 | 0 |
| 7 | 00395 | AQ | CAUSTIC | | 0 | 12 | NC | 0 | 0 | 0 | 0 |
| NA | 00396 | | NO DRUM | | | | | | | | |
| NA | 00397 | | NO DRUM | | | | | | | | |
| NA | 00398 | | NO DRUM | | | | | | | | |
| NA | 00399 | | NO DRUM | | | | | | | | |
| NA | 00400 | | NO DRUM | | | | | | | | |
| 12 | 00403 | AQ | CAUSTIC | | 0 | 11 | NC | 0 | 0 | 0 | 0 |
| 12 | 00412 | AQ | CAUSTIC | | 0 | 11 | NC | 0 | 0 | 0 | 0 |
| 12 | 00413 | AQ | CAUSTIC | | 0 | 11 | NC | 0 | 0 | 0 | 0 |
| 12 | 00415 | AQ | CAUSTIC | | 0 | 11 | NC | 0 | 0 | 0 | 0 |
| 12 | 00418 | AQ | CAUSTIC | | 0 | 11 | NC | 0 | 0 | 0 | 0 |
| 6 | 00426 | AQ | ACIDIC | | 0 | 1 | NC | 1 | 0 | 1 | 1 |
| 7 | 00431 | AQ | CAUSTIC | | 0 | 12 | NC | 0 | 0 | 0 | 0 |
| 12 | 00436 | AQ | CAUSTIC | | 0 | 11 | NC | 0 | 0 | 0 | 0 |
| 9 | 00438 | | ACIDIC | < 50 | 130 | 7 | NC | 0 | 0 | 1 | 0 |
| MT | 00440 | | EMPTY DRUM | | | | | | | | |
| 9 | 00441 | | ACIDIC | < 50 | 60 | 6 | NC | 0 | 0 | 1 | 0 |
| 12 | 00442 | AQ | | < 50 | 0 | 0 | NC | | 0 | 0 | 0 |
| 12 | 00443 | AQ | | | 0 | 5 | | 0 | 0 | 0 | 0 |
| MT | 00444 | | EMPTY DRUM | | | | | | | | |
| MT | 00445 | | EMPTY DRUM | | | | | | | | |
| 12 | 00446 | AQ | ACIDIC | | 0 | 4 | NC | 0 | 0 | 0 | 0 |
| 12 | 00447 | | | < 50 | 0 | 9 | | 0 | 0 | 0 | 0 |
| 9 | 00448 | | ACIDIC | < 50 | 80 | 7 | NC | 0 | 0 | 1 | 0 |
| 12 | 00449 | | | < 50 | 0 | 6 | | 0 | 0 | 0 | 0 |
| S | 00451 | | SOLID | < 50 | 0 | | C | | 1 | 0 | 0 |
| 12 | 00456 | | ACIDIC | < 50 | 60 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00458 | | ACIDIC | < 50 | 0 | 5 | NC | 0 | 0 | 0 | 0 |
| 12 | 00462 | AQ | CAUSTIC | | 0 | 11 | NC | 0 | 0 | 0 | 0 |
| 9 | 00463 | | ACIDIC | < 50 | 150 | 6 | NC | 0 | 0 | 1 | 0 |
| 12 | 00464 | | ACIDIC | < 50 | 0 | 4 | NC | 0 | 0 | 0 | 0 |
| 12 | 00465 | | ACIDIC | < 50 | 13 | 7 | NC | 0 | 0 | 0 | 0 |
| 12 | 00468 | AQ | ACIDIC | | 0 | 3 | NC | 0 | 0 | 0 | 0 |
| 9 | 00470 | | ACIDIC | < 50 | 60 | 6 | NC | 0 | 0 | 1 | 0 |
| 9 | 00471 | AQ | ACIDIC | | 110 | 6 | NC | 0 | 0 | 1 | 0 |
| S | 00477 | | SOLID | < 50 | 20 | 6 | SOLID | 0 | 1 | 0 | 0 |
| MT | 00478 | | EMPTY DRUM | | | | | | | | |
| 12 | 00483 | | | < 50 | 0 | 6 | | 0 | 0 | 0 | 0 |
| 9 | 00486 | | | < 50 | 80 | 6 | | 0 | 0 | 1 | 0 |
| 12 | 00490 | | | < 50 | 0 | 3 | | 0 | 0 | 0 | 0 |
| MT | 00491 | | EMPTY DRUM | | | | | | | | |
| 12 | 00494 | | | < 50 | 10 | 6 | | 0 | 0 | 0 | 0 |
| S | 00495 | | SOLID | < 50 | 0 | | C | | 1 | 0 | 0 |
| 12 | 00496 | | | < 50 | 40 | 5 | | 0 | 0 | 0 | 0 |
| 12 | 00497 | AQ | ACIDIC | | 0 | 6 | NC | 0 | 0 | 0 | 0 |

## DRUMS REMAINING ON SITE - WESTERN PROCESSING, INC.

| LOC | SAMPLE | PHASE | DESCRIPTION | PCB INFO | HNU (PPM) | PH | CLASS | CORR | FLAM | H2O REACT | CHLORIDE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 | 00500 | | ACIDIC | < 50 | 50 | 6 | NC | 0 | 0 | 1 | 0 |
| 12 | 00502 | AQ | ACIDIC | < 50 | 50 | 5 | NC | 0 | 0 | 0 | 0 |
| 9 | 00504 | | ACIDIC | < 50 | 300 | 8 | NC | 0 | 0 | 1 | 0 |
| 9 | 00505 | | ACIDIC | < 50 | 60 | 4 | NC | 0 | 0 | 1 | 0 |
| S | 00506 | | SOLID | < 50 | 0 | | C | | 1 | 0 | 0 |
| 12 | 00507 | | ACIDIC | < 50 | 100 | 4 | NC | 0 | 0 | 0 | 0 |
| 12 | 00508 | AQ | ACIDIC | | 0 | 4 | NC | 0 | 0 | 0 | 0 |
| 12 | 00510 | AQ | ACIDIC | | 0 | 4 | NC | 0 | 0 | 0 | 0 |
| 12 | 00514 | AQ | ACIDIC | | 0 | 3 | NC | 0 | 0 | 0 | 0 |
| 8 | 00516 | | | < 50 | 200 | 3 | | 0 | 1 | 1 | 0 |
| 12 | 00517 | | ACIDIC | < 50 | 10 | 5 | NC | 0 | 0 | 0 | 0 |
| S | 00518 | | SOLID | < 50 | 10 | | C | | 1 | 0 | 0 |
| 12 | 00520 | | ACIDIC | < 50 | 70 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00521 | | ACIDIC | < 50 | 100 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00522 | | ACIDIC | < 50 | 20 | 7 | NC | 0 | 0 | 0 | 0 |
| 12 | 00523 | | ACIDIC | < 50 | 50 | 7 | NC | 0 | 0 | 0 | 0 |
| 12 | 00524 | | ACIDIC | < 50 | 8 | 4 | NC | 0 | 0 | 0 | 0 |
| 12 | 00525 | | | < 50 | 0 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 00526 | AQ | ACIDIC | | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00527 | | | < 50 | 10 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 00528 | | CAUSTIC | < 50 | 6 | 9 | NC | 0 | 0 | 0 | 0 |
| 12 | 00529 | | ACIDIC | < 50 | 19 | 5 | NC | 0 | 0 | 0 | 0 |
| 12 | 00530 | | | < 50 | 0 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 00531 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00533 | | ACIDIC | < 50 | 5 | 8 | NC | 0 | 0 | 0 | 0 |
| 12 | 00534 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| S | 00535 | | SOLID | < 50 | 0 | | C | | 1 | 0 | 0 |
| S | 00536 | | SOLID | < 50 | 8 | | C | | 1 | 0 | |
| 12 | 00542 | | ACIDIC | < 50 | 100 | 5 | NC | 0 | 0 | 0 | |
| 12 | 00544 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | |
| MT | 00545 | MT | | | | | | | | | |
| 12 | 00546 | | ACIDIC | < 50 | 40 | 5 | NC | 0 | 0 | 0 | |
| 12 | 00547 | | | < 50 | 0 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 00548 | AQ | CAUSTIC | | 0 | 10 | NC | 0 | 0 | 0 | |
| S | 00549 | | SOLID | < 50 | 0 | | C | | 1 | 0 | |
| S | 00550 | | TOO SOLID TO SAMPLE | | | | | | | | |
| 12 | 00551 | | ACIDIC | < 50 | 0 | 5 | NC | 0 | 0 | 0 | |
| 12 | 00552 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | |
| S | 00553 | | SOLID | < 50 | 12 | | C | | 1 | 0 | |
| 9 | 00554 | | | < 50 | 70 | 8 | | 0 | 0 | 1 | 0 |
| 12 | 00556 | | ACIDIC | < 50 | 150 | 5 | NC | 0 | 0 | 0 | 0 |
| S | 00557 | | SOLID | < 50 | 20 | | C | | 1 | 0 | 0 |
| 12 | 00559 | | ACIDIC | < 50 | 0 | 5 | NC | 0 | 0 | 0 | 0 |
| S | 00561 | | SOLID | < 50 | 50 | | C | | 1 | 0 | 0 |
| MT | 00570 | MT | | | | | | | | | |
| 12 | 00571 | | ACIDIC | < 50 | 10 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00572 | | ACIDIC | < 50 | 30 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00574 | | ACIDIC | < 50 | 20 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00575 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | 0 |

## DRUMS REMAINING ON SITE - WESTERN PROCESSING, INC.

| LOC | SAMPLE | PHASE | DESCRIPTION | PCB INFO | HNU (PPM) | PH | CLASS | CORR | FLAM | H2O REACT | CHLORIDE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | 00576 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00577 | | ACIDIC | < 50 | 70 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00578 | | ACIDIC | < 50 | 100 | 5 | NC | 0 | 0 | 0 | 0 |
| 12 | 00579 | | ACIDIC | < 50 | 300 | 7 | NC | 0 | 0 | 0 | 0 |
| 12 | 00580 | | ACIDIC | < 50 | 30 | 7 | NC | 0 | 0 | 0 | 0 |
| 12 | 00581 | | ACIDIC | < 50 | 30 | 5 | NC | 0 | 0 | 0 | 0 |
| 9 | 00582 | | ACIDIC | < 50 | 20 | 8 | NC | 0 | 0 | 1 | 0 |
| MT | 00586 | MT | | | | | | | | | |
| S | 00587 | | SOLID | < 50 | 100 | | C | | 1 | 0 | 0 |
| S | 00588 | | SOLID | < 50 | 0 | | C | | 1 | 0 | 0 |
| 9 | 00589 | | ACIDIC | < 50 | 10 | 8 | NC | 0 | 0 | 1 | 0 |
| 12 | 00591 | AQ | ACIDIC | | 0 | 7 | NC | 0 | 0 | 0 | 0 |
| S | 00598 | | SOLID | < 50 | 200 | 6 | SOLID | 0 | 1 | 0 | 0 |
| 12 | 00605 | | ACIDIC | < 50 | 10 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00620 | | | < 50 | 0 | 6 | ACIDIC | 0 | 0 | 0 | 0 |
| 12 | 00622 | | | < 50 | 0 | 5 | ACIDIC | 0 | 0 | 0 | 0 |
| 12 | 00629 | | ACIDIC | < 50 | 20 | 5 | NC | 0 | 0 | 0 | 0 |
| 12 | 00632 | | CAUSTIC | < 50 | 50 | 9 | NC | 0 | 0 | 0 | |
| 12 | 00633 | | ACIDIC | < 50 | 0 | 7 | NC | 0 | 0 | 0 | |
| 12 | 00637 | | ACIDIC | < 50 | 0 | 7 | NC | 0 | 0 | 0 | |
| 12 | 00638 | | ACIDIC | < 50 | 0 | 7 | NC | 0 | 0 | 0 | |
| 12 | 00641 | | | < 50 | 0 | 5 | | 0 | 0 | 0 | 0 |
| S | 00642 | | SOLID | < 50 | 200 | | SOLID | | 1 | 0 | 0 |
| 9 | 00648 | | | < 50 | 100 | 7 | | 0 | 0 | 1 | 0 |
| S | 00652 | | SOLID | < 50 | 200 | | SOLID | | 1 | 0 | 0 |
| 9 | 00653 | | | < 50 | 200 | 7 | | 0 | 0 | 1 | 0 |
| 9 | 00663 | | | < 50 | 150 | 9 | | 0 | 0 | 1 | 0 |
| 12 | 00670 | | | < 50 | 150 | 5 | | 0 | 0 | 0 | 0 |
| 12 | 00675 | | | < 50 | 300 | 3 | | 0 | 0 | 0 | 0 |
| 7 | 00679 | AQ | | | 0 | 12 | | 0 | 0 | 0 | 0 |
| 9 | 00683 | | | < 50 | 70 | 6 | | 0 | 0 | 1 | 0 |
| 11 | 00689 | | | < 50 | 150 | | C | 0 | 1 | 0 | 0 |
| S | 00694 | | SOLID | < 50 | 0 | | C | | 1 | 0 | 0 |
| 7 | 00697 | | | < 50 | 40 | 13 | C | 1 | 1 | 1 | 0 |
| 12 | 00700 | | | < 50 | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| 2 | 00702 | | SOLID | > 50 | 0 | | SOLID | | 0 | 0 | 0 |
| 12 | 00704 | AQ | ACIDIC | | 12 | 7 | NC | 0 | 0 | 0 | |
| 12 | 00705 | AQ | ACIDIC | | 7 | 4 | NC | 0 | 0 | 0 | |
| 12 | 00708 | AQ | CAUSTIC | | 0 | 11 | NC | 0 | 0 | 0 | |
| 12 | 00709 | AQ | CAUSTIC | | 0 | 11 | NC | 0 | 0 | 0 | |
| S | 00710 | | SOLID | < 50 | 0 | | NC | | 0 | 0 | |
| S | 00711 | | SOLID | < 50 | 0 | | NC | | 0 | 0 | |
| S | 00713 | | SOLID | < 50 | 0 | | NC | | 0 | 0 | |
| 12 | 00714 | | CAUSTIC | < 50 | 0 | 11 | NC | 0 | 0 | 0 | |
| 12 | 00715 | AQ | ACIDIC | | 0 | 4 | NC | 0 | 0 | 0 | |
| S | 00718 | | SOLID | < 50 | 100 | | C | | 1 | 0 | 0 |
| 12 | 00719 | | ACIDIC | < 50 | 100 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00721 | AQ | ACIDIC | | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| 6 | 00724 | AQ | ACIDIC | | 0 | 1 | NC | 1 | 0 | 0 | 0 |

| LOC | SAMPLE | PHASE | DESCRIPTION | PCB INFO | HNU (PPM) | PH | CLASS | CORR | FLAM | H2O REACT | CHLORIDE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 00729 | AQ | ACIDIC | | 0 | 1 | NC | 1 | 0 | 0 | 0 |
| 12 | 00730 | | | < 50 | 40 | 10 | | 0 | 0 | 0 | 0 |
| 12 | 00731 | | ACIDIC | < 50 | 30 | 5 | NC | 0 | 0 | 0 | 0 |
| 12 | 00732 | | | < 50 | 0 | 9 | | 0 | 0 | 0 | 0 |
| S | 00733 | | SOLID | < 50 | 0 | | NC | | 0 | 0 | 0 |
| 12 | 00734 | AQ | ACIDIC | | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00735 | AQ | ACIDIC | | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00736 | | | < 50 | 300 | 9 | | 0 | 0 | 0 | 0 |
| 6 | 00737 | AQ | ACIDIC | | 0 | 1 | NC | 1 | 0 | 1 | 0 |
| 11 | 00738 | AQ | ACIDIC | | 0 | 3 | NC | 0 | 0 | 0 | 0 |
| 12 | 00739 | AQ | CAUSTIC | | 0 | 11 | NC | 0 | 0 | 0 | 0 |
| S | 00742 | | SOLID-CAU | < 50 | 0 | 12 | NC | 0 | 0 | 0 | 0 |
| MT | 00744 | MT | | | | | | | | | |
| 12 | 00745 | | AQ | | 0 | 7 | NC | 0 | 0 | 0 | 0 |
| S | 00749 | | SOLID | < 50 | 7 | | C | | 1 | 0 | 0 |
| 12 | 00752 | | | < 50 | 10 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00754 | | SLUDGE | < 50 | 10 | | NC | | 0 | 0 | 0 |
| S | 00756 | | SOLID | < 50 | 20 | | NC | | 0 | 0 | 0 |
| 12 | 00758 | | | < 50 | 0 | 7 | NC | 0 | 0 | 0 | 0 |
| 9 | 00759 | | | < 50 | 0 | 8 | NC | 0 | 0 | 1 | 0 |
| 12 | 00760 | | | < 50 | 0 | 8 | NC | 0 | 0 | 0 | 0 |
| 12 | 00761 | | | < 50 | 0 | 8 | NC | 0 | 0 | 0 | 0 |
| 12 | 00762 | | | < 50 | 0 | 10 | NC | 0 | 0 | 0 | 0 |
| 12 | 00765 | | | < 50 | 10 | 7 | NC | 0 | 0 | 0 | 0 |
| 12 | 00766 | | | < 50 | 15 | 6 | NC | 0 | 0 | 0 | 0 |
| S | 00767 | | SOLID | < 50 | 10 | | SOLID | | 0 | 0 | 0 |
| 12 | 00768 | | | < 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 00769 | | | < 50 | 10 | 8 | | 0 | 0 | 0 | 0 |
| S | 00770 | | SOLID | < 50 | 0 | | SOLID | | 0 | 0 | 0 |
| 9 | 00772 | | | < 50 | 0 | 7 | | 0 | 0 | 1 | 0 |
| 12 | 00774 | | | < 50 | 10 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 00775 | | | < 50 | 0 | 8 | | 0 | 0 | 0 | 0 |
| 12 | 00777 | | | < 50 | 0 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 00778 | | | < 50 | 0 | 5 | | 0 | 0 | 0 | 0 |
| 12 | 00779 | | | < 50 | 0 | 8 | | 0 | 0 | 0 | 0 |
| 12 | 00780 | | | < 50 | 0 | 8 | | 0 | 0 | 0 | 0 |
| S | 00782 | | SOLID | < 50 | 0 | | SOLID | | 1 | 0 | 0 |
| 7 | 00783 | | | < 50 | 0 | 13 | | 1 | 1 | 1 | 0 |
| 12 | 00784 | | | < 50 | 0 | 8 | | 0 | 0 | 0 | 0 |
| 10 | 00786 | | | < 50 | 0 | 5 | C | 0 | 1 | 0 | 0 |
| 12 | 00787 | | | < 50 | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00788 | | | < 50 | 0 | 7 | NC | 0 | 0 | 0 | 0 |
| 12 | 00789 | | | < 50 | 0 | 7 | NC | 0 | 0 | 0 | 0 |
| S | 00791 | | SLUDGE | < 50 | 10 | | C | | 1 | 0 | 0 |
| S | 00793 | | SLUDGE | < 50 | 20 | | C | | 1 | 0 | 0 |
| 9 | 00795 | | | < 50 | 20 | 8 | NC | 0 | 0 | 1 | 0 |
| 12 | 00796 | | | < 50 | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| S | 00797 | | SLUDGE | < 50 | 50 | | C | | 1 | 0 | 0 |
| 12 | 00799 | | | < 50 | 10 | 10 | NC | 0 | 0 | 0 | 0 |

DRUMS REMAINING ON SITE - WESTERN PROCESSING, INC.

| LOC | SAMPLE | PHASE | DESCRIPTION | PCB INFO | HNU (PPM) | PH | CLASS | CORR | FLAM | H2O REACT | CHLORIDE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S | 00800 | | SOLID | ( 50 | 30 | | C | | 1 | 0 | 0 |
| S | 00802 | | SOLID | ( 50 | 130 | | C | | 1 | 0 | 0 |
| S | 00803 | | SOLID | ( 50 | 300 | | C | | 1 | 0 | 0 |
| 12 | 00805 | | CAUSTIC | ( 50 | 100 | 11 | NC | 0 | 0 | 0 | 0 |
| 9 | 00809 | | ACID/REACTV | ( 50 | 100 | 5 | NC | 0 | 0 | 1 | 0 |
| 9 | 00811 | | ACID/REACTV | ( 50 | 150 | 6 | NC | 0 | 0 | 1 | 0 |
| 9 | 00816 | | ACID/REACTV | ( 50 | 200 | 7 | NC | 0 | 0 | 1 | 0 |
| NA | 00824 | | AERSOLCANS | | | | | | | | |
| 9 | 00841 | | ACID/REACTV | ( 50 | 100 | 6 | NC | 0 | 0 | 1 | 0 |
| 9 | 00842 | | ACID/REACTV | ( 50 | 60 | 6 | NC | 0 | 0 | 1 | 0 |
| 9 | 00845 | | ACID/REACTV | ( 50 | 60 | 6 | NC | 0 | 0 | 1 | 0 |
| 12 | 00846 | | ACID | ( 50 | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00847 | | ACIDIC | ( 50 | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00849 | | ACIDIC | ( 50 | 150 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00850 | | ACIDIC | ( 50 | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00851 | | | ( 50 | 0 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 00853 | | | ( 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 00854 | | | ( 50 | 80 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 00855 | | ACIDIC | ( 50 | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00856 | | ACIDIC | ( 50 | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00857 | | ACIDIC | ( 50 | 15 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 00860 | | ACIDIC | ( 50 | 70 | 8 | NC | 0 | 0 | 0 | 0 |
| S | 00870 | | SOLID | ( 50 | 0 | | SOLID | | 1 | 0 | 0 |
| 12 | 00871 | | | ( 50 | 20 | 7 | ACIDIC | 0 | 0 | 0 | 0 |
| 12 | 00878 | | | ( 50 | 0 | 7 | ACIDIC | 0 | 0 | 0 | 0 |
| S | 00883 | | SOLID | ( 50 | 13 | | C | | 1 | 0 | 0 |
| S | 00884 | | SOLID | ( 50 | 20 | | SOLID | | 1 | 0 | 0 |
| 2 | 00885 | | ACIDIC | ) 50 | 100 | 6 | C | 0 | 1 | 0 | 0 |
| 12 | 00888 | | | ( 50 | 20 | 6 | | 0 | 0 | 0 | 0 |
| S | 00898 | | SOLID | ( 50 | 200 | | C | | 1 | 0 | 0 |
| S | 00906 | | SOLID | ( 50 | 20 | | NC | | 0 | 0 | 0 |
| 12 | 00907 | | ACIDIC | ( 50 | 5 | 8 | NC | 0 | 0 | 0 | 0 |
| 9 | 00912 | | ACID/REACTV | ( 50 | 60 | 6 | NC | 0 | 0 | 1 | 0 |
| 12 | 00915 | AQ | | | 0 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 00918 | | ACIDIC | ( 50 | 0 | 6 | ACIDIC | 0 | 0 | 0 | 0 |
| S | 00919 | | SOLID | ( 50 | 0 | | SOLID | | 0 | 0 | 0 |
| S | 00938 | | SOLID | ( 50 | 200 | | NC | | 0 | 0 | 0 |
| 12 | 00943 | | CAUSTIC | ( 50 | 0 | 11 | NC | 0 | 0 | 0 | 0 |
| S | 00947 | | SOLID | ( 50 | 0 | | SOLID | | 1 | 0 | |
| S | 00955 | | SOLID | ( 50 | 400 | | NC | | 0 | 0 | 0 |
| 12 | 00961 | | ACIDIC | ( 50 | 200 | 6 | NC | 0 | 0 | 0 | 0 |
| S | 00964 | | SOLID | ( 50 | 10 | | C | | 1 | 0 | 0 |
| 9 | 00965 | | ACID/REACTV | ( 50 | 100 | 7 | NC | 0 | 0 | 1 | 0 |
| 12 | 00965 | | ACIDIC | ( 50 | 0 | 7 | NC | 0 | 0 | 0 | 0 |
| 12 | 00969 | | ACIDIC | ( 50 | 0 | 5 | NC | 0 | 0 | 0 | 0 |
| 12 | 00974 | | | ( 50 | 200 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 00981 | | ACIDIC | ( 50 | 0 | 5 | NC | 0 | 0 | 0 | 0 |
| 12 | 00984 | | ACIDIC | ( 50 | 50 | 6 | NV | 0 | 0 | 0 | 0 |
| 12 | 00985 | | ACIDIC | ( 50 | 35 | 6 | NC | 0 | 0 | 0 | 0 |

DRUMS REMAINING ON SITE - WESTERN PROCESSING, INC.

| LOC | SAMPLE | PHASE | DESCRIPTION | PCB INFO | HNU (PPM) | PH | CLASS | CORR | FLAM | H2O REACT | CHLORIDE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 | 00995 | | UNKNOWN | < 50 | 70 | | NC | | 0 | 1 | 0 |
| 12 | 00999 | | ACID/REACTV | < 50 | 25 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 01043 | | ACID/REACTV | < 50 | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 01047 | AQ | AQ | | 0 | 5 | NC | 0 | 0 | 0 | 0 |
| 12 | 01057 | | ACID/REACTV | < 50 | 0 | 7 | NC | 0 | 0 | 0 | |
| 5 | 01105 | | GEL | < 50 | 100 | | C | | 1 | 0 | 0 |
| 12 | 01122 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 01124 | | | < 50 | 0 | 6 | ACIDIC | 0 | 0 | 0 | 0 |
| 12 | 01130 | | | < 50 | 60 | 11 | CAUSTI | 0 | 0 | 0 | 0 |
| 12 | 01131 | | SEMI-SOLID | < 50 | 120 | | SOLID | | 1 | 0 | 0 |
| 12 | 01133 | | | < 50 | 150 | 8 | ACIDIC | 0 | 0 | 0 | 0 |
| 9 | 01146 | | | < 50 | 100 | 6 | | 0 | 0 | 1 | 0 |
| 12 | 01159 | | | < 50 | 100 | 6 | | 0 | 0 | 0 | 0 |
| 10 | 01161 | | | < 50 | 300 | 6 | | 0 | 1 | 0 | 0 |
| 12 | 01203 | | | < 50 | 0 | 8 | | 0 | 0 | 0 | 0 |
| 6 | 01207 | | ACIDIC/OXI | < 50 | 250 | 2 | NC | 1 | 0 | 0 | 0 |
| 12 | 01211 | | ACIDIC | < 50 | 5 | 7 | NC | 0 | 0 | 0 | 0 |
| 12 | 01214 | | | < 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 01226 | | ACIDIC | < 50 | 15 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 01227 | | | < 50 | 60 | 6 | ACIDIC | 0 | 0 | 0 | 0 |
| 9 | 01232 | | | < 50 | 60 | 7 | ACIDIC | 0 | 0 | 1 | 0 |
| 9 | 01234 | | | < 50 | 40 | 6 | ACIDIC | 0 | 0 | 0 | 0 |
| 12 | 01241 | | | < 50 | 200 | 5 | ACIDIC | 0 | 0 | 0 | 0 |
| 12 | 01242 | | | < 50 | 200 | 5 | ACIDIC | 0 | 0 | 0 | 0 |
| 12 | 01244 | | | < 50 | 200 | 7 | ACIDIC | 0 | 0 | 0 | 0 |
| 12 | 01245 | | | < 50 | 150 | 5 | ACIDIC | 0 | 0 | 0 | 0 |
| 12 | 01249 | | | < 50 | 0 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 01260 | | CAUSTIC | < 50 | 50 | 10 | NC | 0 | 0 | 0 | 0 |
| 12 | 01271 | | CAUSTIC | < 50 | 200 | 9 | NC | 0 | 0 | 0 | 0 |
| MT | 01281 | | EMPTY DRUM | | | | | | | | |
| 12 | 01287 | | | < 50 | 350 | 7 | ACIDIC | 0 | 0 | 0 | |
| 12 | 01289 | | | < 50 | 250 | 7 | ACIDIC | 0 | 0 | 0 | |
| 9 | 01299 | | ACID/REACTV | < 50 | 350 | 7 | NC | 0 | 0 | 1 | 0 |
| 12 | 01305 | | ACID | < 50 | 300 | 7 | C | 0 | 0 | 0 | 0 |
| 9 | 01308 | | ACID/REACTV | < 50 | 350 | 7 | NC | 0 | 0 | 1 | 0 |
| 12 | 01309 | | ACID/REACTV | < 50 | 20 | 7 | NC | 0 | 0 | 0 | 0 |
| 12 | 01313 | | ACIDIC | < 50 | 350 | 7 | NC | 0 | 0 | 0 | 0 |
| 12 | 01315 | | ACIDIC | < 50 | 350 | 7 | NC | 0 | 0 | 0 | 0 |
| 9 | 01316 | | ACID/REACTV | < 50 | 350 | 7 | NC | 0 | 0 | 1 | 0 |
| 9 | 01319 | | CAUSTIC/REA | < 50 | 350 | 9 | NC | 0 | 0 | 1 | 0 |
| 12 | 01321 | | ACIDIC | < 50 | 200 | 7 | NC | 0 | 0 | 0 | 0 |
| 9 | 01322 | | ACID/REACTV | < 50 | 350 | 7 | NC | 0 | 0 | 1 | 0 |
| 12 | 01326 | | ACIDIC | < 50 | 350 | 8 | NC | 0 | 0 | 0 | 0 |
| 12 | 01333 | | ACIDIC | < 50 | 250 | 7 | C | 0 | 0 | 0 | 0 |
| 11 | 01335 | | CAUSTIC/OXI | < 50 | 150 | 10 | C | 0 | 1 | 0 | 0 |
| 9 | 01336 | | | < 50 | 200 | 5 | | 0 | 0 | 1 | 0 |
| 12 | 01339 | | ACIDIC | < 50 | 300 | 6 | NC | 0 | 0 | 0 | 0 |
| 9 | 01340 | | ACID/REACTV | < 50 | 300 | 8 | NC | 0 | 0 | 1 | 0 |
| 9 | 01341 | | ACID/REACTV | < 50 | 350 | 8 | NC | 0 | 0 | 1 | 0 |

DRUMS REMAINING ON SITE - WESTERN PROCESSING, INC.

| LOC | SAMPLE | PHASE | DESCRIPTION | PCB INFO | HNU (PPM) | PH | CLASS | CORR | FLAM | H2O REACT | CHLORIDE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | 01343 | | ACIDIC | < 50 | 150 | 7 | NC | 0 | 0 | 0 | 0 |
| 12 | 01345 | | ACIDIC | < 50 | 300 | 6 | NC | 0 | 0 | 0 | 0 |
| 12 | 01346 | | ACIDIC | < 50 | 0 | 6 | NC | 0 | 0 | 0 | 0 |
| NA | 01348 | | NO DRUM | | | | | | | | |
| 8 | 01349 | | | < 50 | 0 | 6 | ACIDIC | 0 | 1 | 1 | 0 |
| 12 | 01351 | | | < 50 | 50 | 5 | ACIDIC | 0 | 0 | 0 | 0 |
| 12 | 01352 | | CAUSTIC | < 50 | 60 | 9 | CAUSTI | 0 | 0 | 0 | 0 |
| 12 | 01356 | | CAUSTIC | < 50 | 200 | 9 | CAUSTI | 0 | 0 | 0 | 0 |
| 9 | 01358 | | | < 50 | 0 | 6 | | 0 | 0 | 1 | 0 |
| 12 | 01366 | | ACIDIC | < 50 | 250 | 7 | NC | 0 | 0 | 0 | 0 |
| 12 | 01369 | | ACIDIC | < 50 | 300 | 7 | NC | 0 | 0 | 0 | 0 |
| 9 | 01370 | | ACID/REACTV | < 50 | 300 | 7 | NC | 0 | 0 | 1 | 0 |
| 12 | 01371 | | ACIDIC | < 50 | 200 | 7 | NC | 0 | 0 | 0 | 0 |
| 12 | 01382 | | CAUSTIC | < 50 | 200 | 9 | NC | 0 | 0 | 0 | 0 |
| 12 | 01383 | | ACIDIC | < 50 | 300 | 7 | NC | 0 | 0 | 0 | 0 |
| 10 | 01401 | ACE | | < 50 | 300 | 6 | NC | 0 | 1 | 0 | 0 MT |
| 9 | 01408 | | | < 50 | 100 | 6 | NC | 0 | 0 | 1 | 0 |
| 12 | 01409 | | | < 50 | 200 | 6 | NC | 0 | 0 | 0 | 0 |
| S | 01433 | | SOLID | < 50 | 200 | | NC | | 0 | 0 | 0 |
| 12 | 01435 | | CAUSTIC | < 50 | 300 | 11 | NC | 0 | 0 | 0 | 0 |
| 2 | 01441 | | ACIDIC | > 50 | 250 | 6 | C | 0 | 1 | 0 | 0 |
| 9 | 01445 | | | < 50 | 300 | 6 | NC | 0 | 0 | 1 | 0 |
| 12 | 01450 | | | < 50 | 200 | 7 | NC | 0 | 0 | 0 | 0 |
| 12 | 01458 | | | < 50 | 250 | 7 | NC | 0 | 0 | 0 | 0 |
| 12 | 01485 | | | < 50 | 250 | 4 | NC | 0 | 0 | 0 | 0 |
| 12 | 01487 | | | < 50 | 300 | 6 | | 0 | 0 | 0 | 0 |
| 11 | 01494 | | | < 50 | 400 | 7 | | 0 | 1 | 1 | 0 |
| S | 01502 | | SOLID | < 50 | 250 | | SOLID | | 1 | 0 | 0 |
| S | 01504 | | SOLID | < 50 | 100 | | SOLID | | 1 | | |
| S | 01526 | | SOLID | < 50 | 200 | 6 | | 0 | 1 | 0 | 0 |
| 7 | 01531 | | | < 50 | 250 | 14 | | 1 | 0 | 1 | 0 |
| 12 | 01532 | | | < 50 | 100 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 01536 | | | < 50 | 100 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 01542 | | | < 50 | 250 | 5 | | 0 | 0 | 0 | 0 |
| 12 | 01565 | | | < 50 | 20 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 01566 | | | < 50 | 300 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 01567 | | | < 50 | 100 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 01568 | | | < 50 | 10 | 10 | NC | 0 | 0 | 0 | 0 |
| 12 | 01569 | | | < 50 | 80 | 5 | | 0 | 0 | 0 | 0 |
| S | 01573 | | SOLID | < 50 | 300 | | SOLID | | 1 | 0 | 0 |
| 12 | 01575 | | | < 50 | 200 | 5 | NC | 0 | 0 | 0 | 0 |
| 12 | 01580 | | | < 50 | 0 | 7 | NC | 0 | 0 | 0 | 0 |
| S | 01582 | | SOLID | < 50 | 100 | | SOLID | | 1 | 0 | 0 |
| 12 | 01586 | | | < 50 | 10 | 6 | | 0 | 0 | 0 | 0 |
| 9 | 01587 | | | < 50 | 300 | 6 | | 0 | 0 | 1 | 0 |
| 9 | 01594 | | | < 50 | 10 | 7 | | 0 | 0 | 1 | 0 |
| 9 | 01596 | | | < 50 | 50 | 4 | | 0 | 0 | 1 | 0 |
| 12 | 01609 | | | < 50 | 50 | 7 | NC | 0 | 0 | 0 | 0 |
| 12 | 01649 | | | < 50 | 0 | 5 | | 0 | 0 | 0 | 0 |

DRUMS REMAINING ON SITE - WESTERN PROCESSING, INC.

| LOC | SAMPLE | PHASE | DESCRIPTION | PCB INFO | HNU (PPM) | PH | CLASS | CORR | FLAM | H2O REACT | CHLORIDE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | 01650 | | | < 50 | 0 | 5 | | 0 | 0 | 0 | 0 |
| S | 01661 | | SOLID | < 50 | 60 | | | | 1 | 0 | 0 |
| S | 01667 | | SOLID | < 50 | 70 | | SOLID | | 1 | 0 | 0 |
| 12 | 01678 | | | < 50 | 0 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 01685 | | | < 50 | 20 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 01687 | | | < 50 | 20 | 4 | | 0 | 0 | 0 | 0 |
| 12 | 01688 | | | < 50 | 40 | 4 | | 0 | 0 | 0 | 0 |
| 12 | 01689 | | | < 50 | 10 | 4 | | 0 | 0 | 0 | 0 |
| 12 | 01693 | | | < 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 01694 | | | < 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| 9 | 01700 | | | < 50 | 70 | 6 | | 0 | 0 | 1 | 0 |
| 12 | 01705 | | | < 50 | 100 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 01708 | | | < 50 | 50 | 5 | | 0 | 0 | 0 | 0 |
| S | 01717 | | SOLID | < 50 | 50 | | SOLID | | 1 | 0 | 0 |
| S | 01718 | | SOLID | < 50 | 150 | | SOLID | | 1 | 0 | 0 |
| 12 | 01736 | | | < 50 | 30 | 5 | | 0 | 0 | 0 | 0 |
| 12 | 01744 | | | < 50 | 0 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 01745 | | | < 50 | 40 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 01747 | | | < 50 | 40 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 01757 | | | < 50 | 160 | 5 | | 0 | 0 | 0 | 0 |
| 12 | 01776 | | | < 50 | 50 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 01781 | | | < 50 | 120 | 5 | | 0 | 0 | 0 | 0 |
| 11 | 01783 | | | < 50 | 300 | 4 | | 0 | 1 | 0 | 0 |
| 12 | 01795 | | | < 50 | 60 | 7 | | 0 | 0 | 0 | 1 |
| S | 01802 | | SOLID | < 50 | 400 | | SOLID | | 1 | 0 | 0 |
| 12 | 01815 | | | < 50 | 0 | 6 | | 0 | 0 | 0 | 0 |
| S | 01848 | | SOLID | < 50 | 30 | | SOLID | | 1 | 0 | 0 |
| 12 | 01849 | | | < 50 | 20 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 01860 | | | < 50 | 400 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 01864 | | | < 50 | 400 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 01866 | | | < 50 | 100 | 6 | | 0 | 0 | 0 | 0 |
| 9 | 01868 | | | < 50 | 200 | 6 | | 0 | 0 | 1 | 0 |
| S | 01881 | | SOLID | < 50 | 500 | | SOLID | | 1 | 0 | 0 |
| MT | 01886 | | EMPTY DRUM | | | | | | | | |
| 8 | 01889 | | | < 50 | 500 | 6 | | 0 | 1 | 1 | 1 |
| S | 01893 | | SOLID | < 50 | 500 | | SOLID | | 1 | 0 | 0 |
| 12 | 01915 | | | < 50 | 500 | 6 | | 0 | 0 | 0 | 0 |
| 11 | 01933 | | | < 50 | 400 | 6 | | 0 | 1 | 1 | 1 |
| 12 | 02005 | | | < 50 | 50 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 02007 | | | < 50 | 0 | 9 | | 0 | 0 | 0 | 0 |
| 12 | 02008 | | | < 50 | 20 | 10 | | 0 | 0 | 0 | 0 |
| 12 | 02009 | | | < 50 | 50 | 10 | | 0 | 0 | 0 | 0 |
| 12 | 02012 | | | < 50 | 0 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 02013 | | | < 50 | 15 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 02015 | | | < 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| 9 | 02020 | | | < 50 | 20 | 6 | | 0 | 0 | 1 | 0 |
| 10 | 02022 | | | < 50 | 0 | 7 | | 0 | 1 | 0 | 0 |
| 10 | 02025 | | | < 50 | 0 | 6 | | 0 | 1 | 0 | 0 |
| 9 | 02026 | | | < 50 | 20 | 9 | | 0 | 0 | 1 | 0 |

## DRUMS REMAINING ON SITE - WESTERN PROCESSING, INC.

| LOC | SAMPLE | PHASE | DESCRIPTION | PCB INFO | HNU (PPM) | PH | CLASS | CORR | FLAM | H2O REACT | CHLORIDE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | 02029 | | | < 50 | 200 | 5 | | 0 | 1 | 0 | 0 |
| 9 | 02030 | | | < 50 | 50 | 7 | | 0 | 0 | 1 | 0 |
| 12 | 02036 | | | < 50 | 10 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 02037 | | | < 50 | 20 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 02038 | | | < 50 | 30 | 6 | | 0 | 0 | 0 | 0 |
| S | 02039 | | SOLID | < 50 | 150 | | SOLID | | 1 | 0 | 0 |
| 12 | 02040 | | | < 50 | 0 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 02041 | | | < 50 | 50 | 9 | | 0 | 0 | 0 | 0 |
| 10 | 02042 | | | < 50 | 80 | 6 | | 0 | 1 | 0 | 0 |
| 9 | 02044 | | | < 50 | 0 | 7 | | 0 | 0 | 1 | 0 |
| 9 | 02045 | | | < 50 | 0 | 7 | | 0 | 0 | 1 | 0 |
| S | 02046 | | SOLID | < 50 | 0 | | SOLID | | 1 | 0 | 0 |
| 12 | 02050 | | | < 50 | 20 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02056 | | | < 50 | 20 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 02075 | | | < 50 | 10 | 5 | | 0 | 0 | 0 | 0 |
| S | 02079 | | SOLID | < 50 | 0 | | SOLID | | 1 | 0 | 0 |
| 12 | 02081 | | | < 50 | 0 | 5 | | 0 | 0 | 0 | 0 |
| 12 | 02085 | | | < 50 | 0 | 8 | | 0 | 0 | 0 | 0 |
| S | 02086 | | SOLID | < 50 | 40 | | SOLID | | 1 | 0 | 0 |
| 10 | 02088 | | | < 50 | 150 | 7 | | 0 | 1 | 0 | 0 |
| 12 | 02091 | | | < 50 | 200 | 7 | | 0 | 0 | 0 | 0 |
| 8 | 02092 | | | < 50 | 60 | 7 | | 0 | 1 | 1 | 0 |
| 12 | 02095 | | | < 50 | 30 | 11 | | 0 | 0 | 0 | 0 |
| 12 | 02096 | | | < 50 | 30 | 11 | | 0 | 0 | 0 | 0 |
| 12 | 02097 | | | < 50 | 50 | 11 | | 0 | 0 | 0 | 0 |
| 12 | 02098 | | | < 50 | 20 | 11 | | 0 | 0 | 0 | 0 |
| 12 | 02099 | | | < 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| 7 | 02103 | | | < 50 | 0 | 12 | | 0 | 0 | 0 | 0 |
| 7 | 02106 | | | < 50 | 0 | 12 | | 0 | 0 | 0 | 0 |
| 12 | 02111 | | | < 50 | 100 | | | | 0 | 0 | 0 |
| 12 | 02114 | | | < 50 | 30 | 6 | | 0 | 0 | 0 | 0 |
| 10 | 02115 | | | < 50 | 250 | 6 | | 0 | 1 | 0 | 0 |
| 10 | 02116 | | | < 50 | 100 | 6 | | 0 | 1 | 0 | 0 |
| 8 | 02118 | | | < 50 | 300 | 6 | | 0 | 1 | 1 | 0 |
| 9 | 02120 | | | < 50 | 150 | 6 | | 0 | 0 | 1 | 0 |
| S | 02126 | | SOLID | < 50 | 400 | 6 | SOLID | 0 | 1 | 0 | 0 |
| S | 02134 | | SOLID | < 50 | 400 | | SOLID | | 1 | 0 | 0 |
| S | 02135 | | SOLID | < 50 | 400 | | SOLID | | 1 | 0 | 1 |
| S | 02136 | | SOLID | < 50 | 400 | | SOLID | | 1 | 0 | 0 |
| S | 02138 | | SOLID | < 50 | 300 | | SOLID | | 1 | 0 | 0 |
| S | 02139 | | SOLID | < 50 | 500 | 6 | SOLID | 0 | 1 | 0 | 1 |
| S | 02149 | | SOLID | < 50 | 100 | | SOLID | | 1 | 0 | 0 |
| S | 02150 | | SOLID | < 50 | 0 | | SOLID | | 1 | 0 | 0 |
| 12 | 02151 | | | < 50 | 50 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 02152 | | | < 50 | 300 | 6 | | 0 | 0 | 0 | 0 |
| S | 02157 | | SOLID | < 50 | 30 | | SOLID | | P | P | 0 |
| S | 02168 | | SOLID | < 50 | 500 | 6 | SOLID | 0 | 1 | 0 | 0 |
| 12 | 02175 | | | < 50 | 100 | 6 | | 0 | 0 | 0 | 0 |
| 9 | 02185 | | | < 50 | 400 | 6 | | 0 | 0 | 1 | 0 |

DRUMS REMAINING ON SITE - WESTERN PROCESSING, INC.

| LOC | SAMPLE | PHASE | DESCRIPTION | PCB INFO | HNU (PPM) | PH | CLASS | CORR | FLAM | H2O REACT | CHLORIDE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 | 02186 | | | < 50 | 500 | 6 | | 0 | 0 | 1 | 0 |
| 12 | 02187 | | | < 50 | 20 | 5 | | 0 | 0 | 0 | 0 |
| 12 | 02188 | | | < 50 | 100 | 7 | | 0 | 0 | 0 | 0 |
| S | 02192 | | SOLID | < 50 | 0 | | SOLID | | 1 | 0 | 0 |
| S | 02204 | | SOLID | < 50 | 50 | | SOLID | | 1 | 0 | 0 |
| S | 02213 | | SOLID | < 50 | 80 | | SOLID | | 1 | 0 | 0 |
| S | 02221 | | SOLID | < 50 | 20 | | SOLID | | 1 | 0 | 0 |
| S | 02228 | | SOLID | < 50 | 300 | | SOLID | | 1 | 0 | 0 |
| 12 | 02230 | | | < 50 | 10 | 6 | | 0 | 0 | 0 | 0 |
| S | 02257 | | SOLID | < 50 | 200 | | SOLID | 0 | 1 | 0 | 0 |
| 12 | 02270 | | | < 50 | 30 | 5 | | 0 | 0 | 0 | 0 |
| S | 02279 | | SOLID | < 50 | 400 | | SOLID | | 1 | 0 | 0 |
| S | 02282 | | SOLID | < 50 | 400 | | SOLID | | 1 | 0 | 0 |
| S | 02304 | | SOLID | < 50 | 300 | | SOLID | | 1 | 0 | 0 |
| 9 | 02306 | | | < 50 | 40 | 5 | | 0 | 0 | 1 | 0 |
| 12 | 02307 | | | < 50 | 100 | 5 | | 0 | 0 | 0 | 0 |
| S | 02310 | | SOLID | < 50 | 80 | | SOLID | | 1 | 0 | 0 |
| S | 02311 | | SOLID | < 50 | 80 | | SOLID | | 1 | 0 | 0 |
| 12 | 02315 | | | < 50 | 20 | 5 | | 0 | 0 | 0 | 0 |
| 12 | 02316 | | | < 50 | 150 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 02317 | | | < 50 | 100 | 5 | | 0 | 0 | 0 | 0 |
| 12 | 02318 | | | < 50 | 100 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 02321 | | | < 50 | 0 | 6 | | 0 | 0 | 0 | 0 |
| S | 02322 | | SOLID | < 50 | 100 | | SOLID | | 1 | 0 | 0 |
| 12 | 02324 | | | < 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02327 | | | < 50 | 20 | 5 | | 0 | 0 | 0 | 0 |
| 12 | 02328 | | | < 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| S | 02329 | | SOLID | < 50 | 0 | | SOLID | | 1 | 0 | 0 |
| S | 02331 | | SOLID | < 50 | 300 | | SOLID | | 1 | 0 | 0 |
| 6 | 02332 | | | < 50 | 400 | 1 | | 1 | 1 | 0 | 0 |
| S | 02334 | | SOLID | < 50 | 80 | | SOLID | | 1 | 0 | 0 |
| 6 | 02335 | | | < 50 | 200 | 1 | | 1 | 1 | 0 | 0 |
| S | 02339 | | SOLID | < 50 | 20 | | SOLID | | 1 | 0 | 1 |
| 6 | 02340 | | | < 50 | 0 | 1 | | 1 | 1 | 0 | 0 |
| 12 | 02348 | | | < 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| 6 | 02350 | | | < 50 | 0 | 2 | | 1 | 0 | 0 | 0 |
| 6 | 02351 | | | < 50 | 40 | 1 | | 1 | 0 | 0 | 0 |
| 12 | 02353 | | | < 50 | 40 | 5 | | 0 | 0 | 0 | 0 |
| 12 | 02359 | | | < 50 | 0 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 02360 | | | < 50 | 20 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 02362 | | | < 50 | 40 | 6 | | 0 | 0 | 0 | 0 |
| 7 | 02363 | | | < 50 | 0 | 14 | | 1 | 0 | 0 | 0 |
| S | 02369 | | SOLID | < 50 | 400 | | SOLID | | 1 | 0 | 0 |
| S | 02373 | | SOLID | < 50 | 100 | | SOLID | | 1 | 0 | 0 |
| 12 | 02374 | | | < 50 | 40 | 6 | | 0 | 0 | 0 | 0 |
| S | 02377 | | SOLID | < 50 | 50 | | SOLID | | 1 | 0 | 0 |
| S | 02379 | | SOLID | < 50 | 120 | | SOLID | | 1 | 0 | 0 |
| 12 | 02383 | | | < 50 | 50 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02385 | | | < 50 | 50 | 5 | | 0 | 0 | 0 | 0 |

| LOC | SAMPLE | PHASE | DESCRIPTION | PCB INFO | HNU (PPM) | PH | CLASS | CORR | FLAM | H2O REACT | CHLORIDE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | 02389 | | | < 50 | 100 | 9 | | 0 | 0 | 0 | 0 |
| 12 | 02390 | | | < 50 | 100 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02391 | | | < 50 | 40 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02392 | | | < 50 | 20 | 5 | | 0 | 0 | 0 | 0 |
| 12 | 02393 | | | < 50 | 30 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02396 | | | < 50 | 80 | 8 | | 0 | 0 | 0 | 0 |
| S | 02397 | | SOLID | < 50 | 400 | | SOLID | | 1 | 0 | 0 |
| 12 | 02402 | | | < 50 | 40 | 7 | | 0 | 0 | 0 | 0 |
| S | 02407 | | SOLID | < 50 | 100 | | SOLID | | 1 | 0 | 0 |
| 12 | 02409 | | | < 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02411 | | | < 50 | 50 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 02413 | | | < 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| 10 | 02419 | | | < 50 | 150 | 6 | | 0 | 1 | 0 | 0 |
| 6 | 02420 | | | < 50 | 50 | 2 | | 1 | 0 | 0 | 0 |
| 12 | 02423 | | | < 50 | 20 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 02424 | | | < 50 | 0 | 6 | | 0 | 0 | 0 | 0 |
| 6 | 02433 | | | < 50 | 0 | 1 | | 1 | 0 | 0 | 0 |
| 12 | 02436 | | | < 50 | 0 | 8 | | 0 | 0 | 0 | 0 |
| 12 | 02438 | | | < 50 | 0 | 4 | | 0 | 0 | 0 | 0 |
| 9 | 02439 | | | < 50 | 0 | 4 | | 0 | 0 | 1 | 0 |
| 5 | 02449 | | | < 50 | 0 | 1 | | 1 | 0 | 0 | 0 |
| S | 02451 | | SOLID | < 50 | 0 | | SOLID | | 0 | 0 | 0 |
| 7 | 02453 | | | < 50 | 0 | 14 | | 1 | 1 | 0 | 0 |
| 7 | 02455 | | | < 50 | 0 | 14 | | 1 | 1 | 0 | 0 |
| 7 | 02459 | | | < 50 | 0 | 14 | | 1 | 0 | 0 | 0 |
| S | 02460 | | SOLID | < 50 | 0 | | SOLID | | 0 | 0 | 0 |
| 12 | 02461 | | | < 50 | 0 | 8 | | 0 | 0 | 0 | 0 |
| 12 | 02462 | | | < 50 | 50 | 8 | | 0 | 0 | 0 | 0 |
| 12 | 02464 | | | < 50 | 80 | 5 | | 0 | 0 | 0 | 0 |
| 12 | 02468 | | | < 50 | 100 | 7 | | 0 | 0 | 0 | 0 |
| S | 02469 | | SOLID | < 50 | 200 | | SOLID | | 1 | 0 | 0 |
| 12 | 02471 | | | < 50 | 40 | 8 | | 0 | 0 | 0 | 0 |
| S | 02472 | | SOLID | < 50 | 30 | | SOLID | | 1 | 0 | 0 |
| 12 | 02473 | | | < 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02474 | | | < 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| S | 02477 | | SOLID | < 50 | 0 | | SOLID | | 0 | 0 | 0 |
| S | 02479 | | SOLID | < 50 | 400 | | SOLID | | 1 | 0 | 0 |
| 12 | 02480 | | | < 50 | 0 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 02481 | | | < 50 | 0 | 4 | | 0 | 0 | 0 | 0 |
| S | 02482 | | SOLID | < 50 | 20 | | SOLID | | 1 | 0 | 0 |
| S | 02483 | | SOLID | < 50 | 0 | | SOLID | | 1 | 0 | 0 |
| S | 02486 | | SOLID | < 50 | 0 | | SOLID | | 0 | 0 | 0 |
| 12 | 02487 | | | < 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02488 | | | < 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02489 | | | < 50 | 180 | 6 | | 0 | 0 | 0 | 0 |
| S | 02490 | | SOLID | < 50 | 250 | | SOLID | | 1 | 0 | 0 |
| S | 02493 | | SOLID | < 50 | 200 | | SOLID | | 0 | 0 | 0 |
| 12 | 02495 | | | < 50 | 20 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02496 | | | < 50 | 10 | 5 | | 0 | 0 | 0 | 0 |

## DRUMS REMAINING ON SITE - WESTERN PROCESSING, INC.

| LOC | SAMPLE | PHASE | DESCRIPTION | PCB INFO | HNU (PPM) | PH | CLASS | CORR | FLAM | H2O REACT | CHLORIDE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | 02498 | | | < 50 | 40 | 7 | | 0 | 0 | 0 | 0 |
| S | 02500 | | SOLID | < 50 | 50 | | SOLID | | 1 | 0 | 0 |
| 12 | 02501 | | | < 50 | 10 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 02502 | | | < 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02503 | | | < 50 | 20 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 02504 | | | < 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| S | 02505 | | SOLID | < 50 | 0 | | | | 0 | 0 | 0 |
| 12 | 02506 | | SOLID | < 50 | 40 | | | | 0 | 0 | 0 |
| S | 02508 | | SOLID | < 50 | 100 | | SOLID | | 1 | 0 | 0 |
| 12 | 02509 | | | < 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02510 | | | < 50 | 20 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02511 | | | < 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| S | 02512 | | SOLID | < 50 | 0 | | SOLID | | 0 | 0 | 0 |
| 12 | 02513 | | | < 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| 9 | 02515 | | | < 50 | 100 | 7 | | 0 | 0 | 1 | 0 |
| 12 | 02516 | | | < 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02517 | | | < 50 | 400 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 02519 | | | < 50 | 0 | 6 | | 0 | 0 | 0 | 0 |
| 9 | 02521 | | | < 50 | 100 | 8 | | 0 | 0 | 1 | 0 |
| S | 02522 | | SOLID | < 50 | 30 | | SOLID | | 1 | 0 | 0 |
| 12 | 02524 | | | < 50 | 0 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 02525 | | | < 50 | 0 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 02526 | | | < 50 | 50 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 02527 | | | < 50 | 0 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 02529 | | | < 50 | 0 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 02532 | | | < 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02533 | | | < 50 | 0 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 02534 | | | < 50 | 0 | 6 | | 0 | 0 | 0 | 0 |
| S | 02535 | | SOLID | < 50 | 500 | | SOLID | | 1 | 0 | 0 |
| S | 02536 | | SOLID | < 50 | 0 | | SOLID | | 0 | 0 | 0 |
| 12 | 02537 | | | < 50 | 0 | 4 | | 0 | 0 | 0 | 0 |
| 12 | 02538 | | | < 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02539 | | | < 50 | 0 | 4 | | 0 | 0 | 0 | 0 |
| S | 02540 | | SOLID | < 50 | 0 | | SOLID | | 0 | 0 | 0 |
| 12 | 02541 | | | < 50 | 0 | 4 | | 0 | 0 | 0 | 0 |
| 12 | 02542 | | | < 50 | 0 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 02544 | | | < 50 | 0 | 4 | | 0 | 0 | 0 | 0 |
| S | 02545 | | SOLID | < 50 | 0 | | SOLID | | 1 | 0 | 0 |
| 12 | 02547 | | | < 50 | 0 | 4 | | 0 | 0 | 0 | 0 |
| 12 | 02549 | | | < 50 | 20 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 02550 | | | < 50 | 20 | 6 | | 0 | 0 | 0 | 0 |
| S | 02552 | | SOLID | < 50 | 100 | | SOLID | | 1 | 0 | 0 |
| 12 | 02554 | | | < 50 | 70 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02555 | | | < 50 | 100 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02556 | | | < 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02559 | | | < 50 | 200 | 6 | | 0 | 0 | 0 | 0 |
| S | 02560 | | SOLID | < 50 | 300 | | SOLID | | 1 | 0 | 1 |
| S | 02561 | | SOLID | < 50 | 0 | | SOLID | | 1 | 0 | 0 |
| S | 02562 | | SOLID | < 50 | 0 | | SOLID | | 0 | 0 | 0 |

DRUMS REMAINING ON SITE - WESTERN PROCESSING, INC.

| LOC | SAMPLE | PHASE | DESCRIPTION | PCB INFO | HNU (PPM) | PH | CLASS | CORR | FLAM | H2O REACT | CHLORIDE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S | 02563 | | SOLID | ( 50 | 0 | | SOLID | | 0 | 0 | 0 |
| 7 | 02564 | | | ( 50 | 0 | 13 | | 1 | 1 | 0 | 0 |
| 12 | 02565 | | | ( 50 | 0 | 10 | | 0 | 0 | 0 | 0 |
| 12 | 02567 | | | ( 50 | 0 | 5 | | 0 | 0 | 0 | 0 |
| S | 02569 | | SOLID | ( 50 | 0 | | SOLID | | 0 | 0 | 0 |
| 12 | 02571 | | | ( 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| S | 02577 | | SOLID | ( 50 | 100 | | SOLID | | 1 | 0 | 0 |
| 12 | 02580 | | | ( 50 | 40 | 6 | | 0 | 0 | 0 | 0 |
| S | 02583 | | SOLID | ( 50 | 150 | | SOLID | | 1 | 0 | 0 |
| 12 | 02586 | | | ( 50 | 100 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 02587 | | | ( 50 | 50 | 6 | | 0 | 0 | 0 | 0 |
| S | 02588 | | SOLID | ( 50 | 400 | | SOLID | | 1 | 0 | 0 |
| 12 | 02592 | | | ( 50 | 150 | 6 | | 0 | 0 | 0 | 0 |
| S | 02594 | | SOLID | ( 50 | 20 | | SOLID | | 0 | | 0 |
| S | 02599 | | SOLID | ( 50 | 20 | | SOLID | | 0 | 0 | 0 |
| S | 02600 | | SOLID | ( 50 | 0 | | SOLID | | 0 | 0 | 0 |
| 10 | 02603 | | | ( 50 | 0 | 7 | | 0 | 1 | 0 | 0 |
| 12 | 02604 | | | ( 50 | 70 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02606 | | | ( 50 | 400 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02616 | | | ( 50 | 30 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02617 | | | ( 50 | 30 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02619 | | | ( 50 | 50 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02622 | | | ( 50 | 80 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02623 | | | ( 50 | 80 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02624 | | | ( 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02625 | | | ( 50 | 60 | 7 | | 0 | 0 | 0 | 0 |
| S | 02635 | | SOLID | ( 50 | 0 | | SOLID | | 0 | 0 | 0 |
| S | 02636 | | SOLID | ( 50 | 0 | | SOLID | | 0 | 0 | 0 |
| 12 | 02638 | | | ( 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02639 | | | ( 50 | 0 | 4 | | 0 | 0 | 0 | 0 |
| S | 02640 | | SOLID | ( 50 | 0 | | SOLID | | 0 | 0 | 0 |
| 12 | 02644 | | | ( 50 | 0 | 6 | | 0 | 0 | 0 | 0 |
| S | 02649 | | SLUDGE | ( 50 | 50 | | | | 1 | 0 | 0 |
| 12 | 02650 | | | ( 50 | 0 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 02652 | | | ( 50 | 0 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 02654 | | | ( 50 | 0 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 02655 | | | ( 50 | 50 | 7 | | 0 | 0 | 0 | 0 |
| S | 02656 | | SLUDGE | ( 50 | 100 | 6 | | 0 | 1 | 0 | 0 |
| 12 | 02657 | | | ( 50 | 0 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 02658 | | | ( 50 | 0 | 6 | | 0 | 0 | 0 | 0 |
| S | 02661 | | SOLID | ( 50 | 0 | | SOLID | | 1 | 0 | 0 |
| S | 02662 | | TAGLIKE | ( 50 | 30 | 7 | | 0 | 1 | 0 | 0 |
| S | 02663 | | SLUDGE | ( 50 | 0 | 7 | | 0 | 1 | 0 | 0 |
| S | 02664 | | SLUDGE | ( 50 | 15 | 6 | | 0 | 1 | 0 | 0 |
| S | 02665 | | | ( 50 | 10 | 6 | | 0 | 1 | 0 | 0 |
| S | 02666 | | SLUDGE | ( 50 | 0 | 6 | | 0 | 1 | 0 | 0 |
| 12 | 02668 | | | ( 50 | 30 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02669 | | | ( 50 | 20 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02671 | | | ( 50 | 0 | 5 | | 0 | 0 | 0 | 0 |

DRUMS REMAINING ON SITE - WESTERN PROCESSING, INC.

| LOC | SAMPLE | PHASE | DESCRIPTION | PCB INFO | HNU (PPM) | PH | CLASS | CORR | FLAM | H2O REACT | CHLORIDE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S | 02674 | | SOLID | ( 50 | 20 | | SOLID | | 1 | 0 | 0 |
| 12 | 02675 | | | ( 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02676 | | | ( 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02678 | | | ( 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| S | 02679 | | SOLID | ( 50 | 0 | | SOLID | | 0 | 0 | 0 |
| 12 | 02680 | | | ( 50 | 0 | 6 | | 0 | 0 | 0 | 0 |
| S | 02681 | | SOLID | ( 50 | 0 | | SOLID | | 0 | 0 | 0 |
| S | 02682 | | SOLID | ( 50 | 0 | | SOLID | | 0 | 0 | 0 |
| 12 | 02683 | | | ( 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02686 | | | ( 50 | 20 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02692 | | | ( 50 | 100 | 7 | | 0 | 0 | 0 | 0 |
| MT | 02697 | | EMPTY DRUM | | | | | | | | |
| 12 | 02699 | | | ( 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| S | 02702 | | SLUDGE | ( 50 | 200 | | | | 1 | 0 | 0 |
| 12 | 02704 | | | ( 50 | 0 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 02705 | | | ( 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| S | 02706 | | SOLID | ( 50 | 300 | | SOLID | | 1 | 0 | 0 |
| S | 02709 | | SOLID | ( 50 | 300 | | SOLID | | 1 | 0 | 0 |
| S | 02711 | | SOLID | ( 50 | 200 | | SOLID | | 1 | 0 | 0 |
| 12 | 02722 | | | ( 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02723 | | | ( 50 | 400 | 7 | | 0 | 0 | 0 | 0 |
| 2 | 02727 | | | ) 50 | 400 | | SOLID | | 1 | 0 | 0 |
| 12 | 02728 | | | ( 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02730 | | | ( 50 | 20 | 7 | | 0 | 0 | 0 | 0 |
| 7 | 02732 | | | ( 50 | 20 | 13 | | 1 | 0 | 0 | 0 |
| 6 | 02744 | | | ( 50 | 0 | 1 | | 1 | 1 | 1 | 1 |
| S | 02745 | | SOLID | ( 50 | 250 | | SOLID | | 1 | 0 | 0 |
| 12 | 02752 | | | ( 50 | 0 | 6 | | 0 | 0 | 0 | 0 |
| 10 | 02758 | | | ( 50 | 0 | 6 | | 0 | 1 | 0 | 0 |
| 12 | 02759 | | | ( 50 | 0 | 7 | | 0 | 0 | 0 | 1 |
| 6 | 02761 | | | ( 50 | 0 | 1 | | 1 | 0 | 0 | 0 |
| S | 02762 | | SOLID | ( 50 | 0 | | SOLID | | 0 | 0 | 0 |
| 12 | 02763 | | | ( 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| 6 | 02765 | | | ( 50 | 0 | 1 | | 1 | 0 | 1 | 0 |
| 6 | 02776 | | | ( 50 | 0 | 1 | | 1 | 0 | 0 | 1 |
| 6 | 02777 | | | ( 50 | 0 | 1 | | 1 | 0 | 0 | 1 |
| 6 | 02778 | | | ( 50 | 0 | 1 | | 1 | 0 | 0 | 1 |
| 9 | 02779 | | | ( 50 | 10 | 8 | | 0 | 0 | 1 | 0 |
| 6 | 02782 | | | ( 50 | 10 | 1 | | 1 | 0 | 0 | 0 |
| 7 | 02783 | | | ( 50 | 10 | 12 | | 0 | 0 | 0 | 0 |
| 12 | 02784 | | | ( 50 | 10 | 7 | | 0 | 0 | 0 | 0 |
| S | 02785 | | | ( 50 | 0 | | SOLID | | 0 | 0 | 0 |
| 12 | 02786 | | | ( 50 | 10 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 02787 | | | ( 50 | 0 | 8 | | 0 | 0 | 0 | 0 |
| MT | 02797 | | EMPTY | | | | | | | | |
| 11 | 02800 | | | ( 50 | 50 | 7 | | 0 | 1 | 0 | 0 |
| 6 | 02802 | | | ( 50 | 110 | 1 | | 1 | 0 | 1 | 0 |
| S | 02818 | | SOLID | ( 50 | 0 | | SOLID | | 0 | 0 | 0 |
| S | 02820 | | SLUDGE | ( 50 | 20 | | | | 0 | 0 | 0 |

DRUMS REMAINING ON SITE - WESTERN PROCESSING, INC.

| LOC | SAMPLE | PHASE | DESCRIPTION | PCB INFO | HNU (PPM) | PH | CLASS | CORR | FLAM | H2O REACT | CHLORIDE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S | 02822 | | SOLID | ( 50 | 0 | | SOLID | | 0 | 0 | 0 |
| S | 02823 | | SOLID | ( 50 | 0 | | SOLID | | 0 | 0 | 0 |
| S | 02828 | | SOLID | ( 50 | 100 | | SOLID | | 1 | 0 | 0 |
| 2 | 02834 | | | )500 | 100 | 7 | | 0 | 1 | 0 | 1 |
| 6 | 02835 | | | ( 50 | 0 | 1 | | 1 | 0 | 0 | 0 |
| NA | 02839 | | NO DRUM | | | | | | | | |
| S | 02840 | | SOLID | ( 50 | 0 | | SOLID | | 1 | 0 | 0 |
| 12 | 02841 | | | ( 50 | 0 | 9 | | 0 | 0 | 0 | 0 |
| 12 | 02842 | | | ( 50 | 0 | 11 | | 0 | 0 | 0 | 0 |
| 6 | 02849 | | | ( 50 | 0 | 1 | | 1 | 0 | 1 | 0 |
| 12 | 02854 | | | ( 50 | 20 | 4 | | 0 | 0 | 0 | 0 |
| S | 02864 | | SLUDGE | ( 50 | 0 | 7 | | 0 | 1 | 0 | 1 |
| 8 | 02866 | | | ( 50 | 80 | 8 | | 0 | 1 | 1 | 1 |
| 12 | 02868 | | | ( 50 | 50 | 6 | | 0 | 0 | 0 | 0 |
| 12 | 02869 | | | ( 50 | 70 | 9 | | 0 | 0 | 0 | 0 |
| 6 | 02872 | | | ( 50 | 0 | 1 | | 1 | 0 | 1 | 1 |
| 6 | 02873 | | | ( 50 | 0 | 1 | | 1 | 0 | 0 | 1 |
| 12 | 02878 | | | ( 50 | 0 | 7 | | 0 | 0 | 0 | 0 |
| 7 | 02883 | | | | 0 | 14 | | 1 | 1 | 1 | 0 |
| 12 | 02885 | | | | 0 | 7 | | 0 | 0 | 0 | 0 |
| 12 | 02887 | | | | 0 | 7 | | 0 | 0 | 0 | 0 |



EA0190

APPENDIX B
**EMPTY AND FULL TANKS ONSITE**

EA0191

TABLE B-1

TANKS POTENTIALLY CONTAINING BUNKER OIL[a]
(ASSUMED FULL)

| Tank No. | Status | Capacity[b] (gal.) | Structural Integrity | Contents | Classification | pH | Methylene Chloride (ppm) | PCB Level (ppm) | Flash Point (°F) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| B1 | Full | 55,711 | Good | Oily Water | Nonhaz | -- | -- | <50 | >150 | |
| T-68 | Full | 5,234 | Good | Oily Water | Flammable | | -- | <50 | <90 | |
| T-200 | Full | 4,320 | Good | Oily Water | Nonhaz | -- | -- | <50 | >150 | |
| T-201 | Full | 1,688 | Good | Oily Water | Nonhaz | 7 | 0 | <50 | >150 | |
| T-210 | Full | 4,700 | Good | Oily Water | Nonhaz | 6 | -- | <50 | >150 | |
| T-211 | Full | 6,078 | Good | Oily Water | Flammable | 7 | -- | <50 | 87 | |
| T-220 | ? | 9,400 | Bad | Oily Water | Nonhaz | 7 | -- | <50 | >150 | |
| Estimated Total: | | 87,131 | | | | | | | | |

Sources:

[a] Roy F. Weston, Inc., May 1984.

[b] CH2M HILL, May 1984.

TABLE B-2

TANKS WITH HIGH ARSENIC CONTENT[a]
(ASSUMED FULL)

| Tank No. | Status | Capacity (gal.)[b] | Structural Integrity | Contents | Classification | pH | Methylene Chloride (ppm) | PCB Level (ppm) | Flash Point (°F) | Arsenic (ppm) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| T-9 | Full | 12,084 | Good | Synfuel | Nonhaz | 7 | <20 | <50 | >150 | 130 | |
| T-51 | Full | 46,105 | Good | Synfuel | Nonhaz | 6 | <20 | <50 | >140 | 82 | Total organic halidesas Cl = 6,700 ppm |
| T-52 | Full | 46,105 | Good | Synfuel | Nonhaz | 7 | <20 | <50 | >140 | 16 | (T-8, T-104, T-105, T-53) |
| T-53 | Full | 46,105 | Good | Synfuel | Nonhaz | 7 | 9 | <50 | >140 | 34 | |
| T-103 | Full | 8,272 | Good | Synfuel | Nonhaz | 8 | 20 | <50 | 90 | 50 | |
| T-106 | Full | 5,499 | Good | Synfuel | Nonhaz | 8 | 56 | <50 | >150 | 49 | |
| T-121 | Full | 7,899 | Good | Synfuel | Water Reactive | 9 | <20 | <50 | >140 | 56 | |
| T-140 | Full | 11,018 | Good | Synfuel | Flammable | 10 | 20 | <50 | >140 | 114 | |
| T-144 | Full | 20,615 | Good | Synfuel | Nonhaz | 8 | <20 | <50 | >140 | 104 | |
| T-145 | Full | 20,615 | Good | Synfuel | Nonhaz | 8 | 480 | <50 | >140 | 103 | |
| T-206 | Full | 9,787 | Good | Synfuel | Nonhaz | 8 | -- | <50 | >150 | 70 | |

Estimated Total: 235,104

Sources:

[a] Roy F. Weston, Inc., May 1984.

[b] CH2M HILL, May 1984.

TABLE B-3

## TANKS POTENTIALLY CONTAINING MIXTURES (ASSUMED FULL)

| Tank No. | Status | Capacity (gal.)[b] | Structural Integrity | Contents | Classification | pH | Methylene Chloride (ppm) | PCB Level (ppm) | Flash Point (°F) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| T-21 | Full | 3,384 | Good | Chlorinated Solvent | Nonhaz | 6 | -- | <50 | 90 | |
| T-23 | Full | 3,384 | Good | Chlorinated Solvent | Water Reactive | 6 | -- | <50 | <60 | Toluene = 83 ppm, Ethylbenzene = 54 ppm, xylene = 258 ppm |
| T-25 | Full | 3,384 | Good | -- | Flammable | 5 | -- | <50 | 85 | |
| T-62 | Full | 13,512 | Good | Mixed Organics | Flammable | 6 | -- | <50 | 90 | |
| T-65 | Full | 5,234 | Good | Solvent | Flammable | -- | -- | <50 | 90-100 | |
| T-66 | Full | 3,807 | Good | Solvent | Flammable | 6 | 21 | <50 | <90 | |
| T-104[b] | Full | 6,153 | Good | Flammable Liquids | Flammable | -- | -- | <50 | -- | Refilled with bulk flammable liquids from drums |
| T-105[b] | Full | 6,153 | Good | Flammable | Flammable | -- | -- | <50 | -- | Refilled with bulk flammable liquids from drums |
| T-142 | Full | 4,220 | Good | -- | Flammable | 6 | -- | <50 | <90 | |
| T-219 | Full | 4,245 | Good | -- | Flammable | 6 | -- | <50 | <85 | |
| Estimated Total: | | 53,476 | | | | | | | | |

Sources:

[a]Roy F. Weston, Inc., May 1984.

[b]CH2M HILL, May 1984.

Note: Tank volumes determined by emergency response team do not correspond to site reconnaissance capacities. Some volumes identified to be larger than capacity of tanks. Used tank capacities for this purpose.

## TABLE B-4

## TANKS WITH METHYLENE CHLORIDE (ASSUMED FULL)

| Tank No. | Status | Capacity (gal.)[b] | Structural Integrity | Contents | Classification | pH | Methylene Chloride (ppm) | PCB Level (ppm) | Flash Point (°F) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| T-10 | Full | 2,015 | Good | Synfuel | Nonhaz | 6 | 234 | <50 | <90 | Flammable; total organic halogens as Cl[b] = 6,700 ppm |
| T-54 | Full | 7,943 | Good | Bunker oil | Nonhaz | 6 | 450 | <50 | >150 | |
| T-61 | Full | 13,512 | Good | Synfuel | Flammable | 7 | 198 | <50 | <90 | |
| T-101 | Full | 20,562 | Good | Synfuel | Nonhaz | 8 | 24 | <50 | >140 | |
| T-102 | Full | 11,280 | Good | Synfuel | Nonhaz | 8 | 10 | <50 | >140 | |
| T-116 | Full | 47,374 | Good | Synfuel | Nonhaz | 10 | 24 | <50 | -- | |
| T-130 | Full | 25,379 | Good | Ketone Solvent/ Synfuel | Flammable | 7 | 1,164 | <50 | <90 | |
| Estimated Total: | | 128,065 | | | | | | | | |

Sources:

[a]Roy F. Weston, Inc., May 1984.

[b]CH2M HILL, May 1984.

## TABLE B-5

## TANKS CONTAINING CAUSTIC LIQUIDS[a]

| Tank No. | Status | Capacity (gal.)[b] | Structural Integrity | Contents | Classi-fication | pH | Methylene Chloride (ppm) | PCB Level (ppm) | Flash Point (°F) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| T-122 | Full | 7,899 | Good | Synfuel | Caustic | 12 | <20 | <50 | >150 | |

Sources:

[a]Roy F. Weston, Inc., May 1984.

[b]CH2M HILL, May 1984.

TABLE B-6

TANKS WITH UNKNOWN CONTENTS
(ASSUMED FULL)

| Tank No. | Status | Capacity (gal.)[b] | Structural Integrity | Contents | Classification | pH | Methylene Chloride (ppm) | PCB Level (ppm) | Flash Point (°F) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| T-0[b] | -- | 1,910 | -- | -- | -- | -- | -- | -- | -- | |
| T-1[b] | -- | 587 | -- | -- | -- | -- | -- | -- | -- | |
| T-2[b] | -- | 587 | -- | -- | -- | -- | -- | -- | -- | |
| T-34[b] | -- | 2,826 | -- | -- | -- | -- | -- | -- | -- | |
| T-123[a] | Full | 7,899 | Good | Synfuel | -- | -- | -- | <50 | >140 | |
| T-131[b] | -- | 8,225 | -- | -- | -- | -- | -- | -- | -- | |
| T-215[a] | Full | 1,469 | Good | -- | Nonhaz | 6 | -- | <50 | >150 | |
| T-222[b] | -- | 2,618 | Good | -- | -- | -- | -- | -- | -- | |
| T-223[b] | -- | 2,244 | Good | -- | -- | -- | -- | -- | -- | |
| T-224[b] | -- | 3,351 | Good | -- | -- | -- | -- | -- | -- | |
| B-7[b] | -- | 9,425 | -- | -- | -- | -- | -- | -- | -- | |
| B-19[b] | -- | 881 | -- | -- | -- | -- | -- | -- | -- | |
| H[b] | -- | 1,885 | -- | -- | -- | -- | -- | -- | -- | |
| J[b] | -- | 5,430 | -- | -- | -- | -- | -- | -- | -- | |
| K[b] | -- | 5,430 | -- | -- | -- | -- | -- | -- | -- | |
| M[b] | -- | 9,596 | -- | -- | -- | -- | -- | -- | -- | |
| Q[b] | -- | 9,278 | -- | -- | -- | -- | -- | -- | -- | |
| R[b] | -- | 9,278 | -- | -- | -- | -- | -- | -- | -- | |

TABLE B-6 (cont.)

| Tank No. | Status | Capacity (gal.)[b] | Structural Integrity | Contents | Classification | pH | Methylene Chloride (ppm) | PCB Level (ppm) | Flash Point (°F) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| T-S[b] | -- | 19,575 | -- | -- | -- | -- | -- | -- | -- | |
| T-T[b] | -- | 13,535 | -- | -- | -- | -- | -- | -- | -- | |
| U[b] | -- | 5,924 | -- | -- | -- | -- | -- | -- | -- | |
| V[b] | -- | 3,331 | -- | -- | -- | -- | -- | -- | -- | |
| W[b] | -- | 13,535 | -- | -- | -- | -- | -- | -- | -- | |
| X[b] | -- | 9,400 | -- | -- | -- | -- | -- | -- | -- | |
| Estimated Total: | | 148,219 | | | | | | | | |

Sources:

[a]Roy F. Weston, Inc., May 1984.

[b]CH2M HILL, May 1984.

## TABLE B-7

## INFORMATION ON EMPTY TANKS AT WESTERN PROCESSING[a]

| Tank No. | Capacity[b] (gal.) | Structural Integrity | Original Tank Contents | Classification | pH | Methylene Chloride (ppm) | PCB Level (ppm) | Flash Point (°F) | Comments |
|---|---|---|---|---|---|---|---|---|---|
| T-3 | 1,459 | Good | Ink | Nonhaz | -- | 67.5 | <50 | -- | Emptied into drums |
| T-8 | 12,084 | Bad | Synfuel | Water Reactive | 7 | 342 | <50 | 95 | Transferred to T-100 and T-53 Arsenic = 58 ppm Total organic halogens as Cl = 690 ppm[c] |
| T-11 | 8,348 | Bad | Synfuel | Nonhaz | 7 | 25 | <50 | -- | Shipped 06/10/83 |
| T-12 | 5,287 | Bad | Flammable Solvent | Water Reactive | 6 | 135 | <50 | -- | Shipped 06/08/83 |
| T-22 | 3,384 | Good | Chlorinated Solvent | Water Reactive | 6 | -- | <50 | <60 | Transferred to T-23, 06/26/83 |
| T-24 | 3,384 | Bad | Chlorinated solvent | Combustible | -- | -- | <50 | -- | Shipped 06/09/83 |
| T-26 | 3,384 | Bad | -- | Flammable | 6 | -- | <50 | -- | Shipped 06/09/83 |
| T-33 | 3,008 | Bad | Oily Water | Nonhaz | 3 | -- | <50 | >150 | Transferred to B-1, 06/24/83 |
| T-39 | 2,820 | Bad | Synfuel | Caustic | 12 | 237 | <50 | >150 | Shipped 06/24/84 |
| T-63 | 9,338 | Bad | Synfuel | Nonhaz | 6 | -- | <50 | >140 | Transferred to T-62, 06/13/83 |

TABLE B-7 (cont.)

| Tank No. | Capacity[b] (gal.) | Structural Integrity | Original Tank Contents | Classi-fication | pH | Methylene Chloride (ppm) | PCB Level (ppm) | Flash Point (°F) | Comments |
|---|---|---|---|---|---|---|---|---|---|
| T-64 | 9,338 | Bad | Synfuel | Water Reactive | 11 | -- | <50 | -- | Shipped 06/13/83 Does not flash below 150°F |
| T-67 | 3,760 | Bad | Ester Solvent | Flammable | 6 | 447 | <50 | <100 | Transferred to T-66, 06/16/83 |
| T-69 | 3,760 | Bad | MeCL/ Phenol | Oxidizer | 9 | -- | <50 | -- | Shipped 06/09/83 Phenol = 26,000 ppm |
| T-100 | 13,911 | Bad | Synfuel | Flammable | 8 | 11 | <50 | 95 | Shipped 06/22/83 |
| T-104 | 6,333 | Good | Synfuel | Flammable | 8 | <20 | <50 | 90 | Transferred to T-53, 06/09/83 |
| T-105 | 6,333 | Good | Synfuel | Nonhaz | 8 | <20 | <50 | >150 | Transferred to T-53 |
| T-117 | 47,374 | Bad | Synfuel | Nonhaz | 10 | 6 | <50 | >150 | Shipped 06/24/83 |
| T-118 | 15,039 | Bad | Synfuel | Nonhaz | 8 | <20 | <50 | >150 | Shipped 06/14/83 |
| T-131 | 8,225 | Good | Synfuel | Nonhaz | 7 | 154 | <50 | | Shipped 06/14/83 |
| T-141 | 4,220 | Bad | Still Bottoms | Flammable | 7 | 450 | <50 | 95 | Pumped into T-66, 06/16/83 |

TABLE B-7 (cont.)

| Tank No. | Capacity (gal.)[b] | Structural Integrity | Original Tank Contents | Classification | pH | Methylene Chloride (ppm) | PCB Level (ppm) | Flash Point (°F) | Comments |
|---|---|---|---|---|---|---|---|---|---|
| T-143 | 9,914 | Bad | Ketone | Flammable Solvent | 6 | -- | <50 | -- | Shipped 06/09/83 |
| T-202 | 5,924 | Bad | -- | Flammable Caustic | 14 | -- | <50 | <85 | Transferred to T-19 |
| T-204 | 4,862 | Bad | -- | Caustic/ Water Reactive | 14 | 450 | <50 | -- | Shipped 06/08/83 |
| T-221 | 14,661 | Good | NaOH | Flammable/ Caustic | 14 | -- | -- | | Pumped to acid waste pond |
| B-2 | 40,931 | Good | Water | Nonhaz. | 7 | -- | -- | -- | Shipped to Crosby and Overton |
| B-3 | 40,931 | Good | Water | Nonhaz. | 6 | -- | -- | -- | Shipped to Crosby and Overton |
| B-4 | ? | Good | Water, Zinc/ Oxide | Nonhaz. | 6 | -- | -- | -- | Shipped to Crosby and Overton |
| B-6 | 11,519 | Good | Acid | Corrosive | 1 | -- | -- | -- | Shipped off |

Estimated Total: 345,636 gal.

Sources:

[a]Roy F. Weston, Inc., May 1984.

[b]CH2M HILL, May 1984.

[c]Laucks Analysis, June 14, 1983.

APPENDIX C
**POTENTIAL REMEDIAL ALTERNATIVES BY WASTE TYPE**

EA0202

WASTE TYPE: A. Corrosive Liquids
CONTAINERIZATION: Tanks, Pits, and Drums

| Disposal Alternative | Possible Fatal Flaws | Comments |
|---|---|---|
| 1. Onsite treatment--discharge to Metro[a] | Metro may not allow under discharge permits<br><br>WDOE may not allow the process onsite | Neutralization tank, mixer, pH control system, and chemical feeding required (at minimum)<br><br>May be less expensive than offsite alternatives (depending on volume)<br><br>Can use onsite tanks to neutralize<br><br>Need to repair or replace existing line to Metro sewer<br><br>Need characterization and bench tests |
| 2. Onsite treatment--discharge to Mill Creek | WDOE may not allow discharge to Mill Creek<br><br>Insufficient time for necessary sampling, analysis, testing, and treatment mobilization<br><br>WDOE may not allow this process onsite | Discharge permits unlikely<br><br>Sampling, analysis, and bench testing required |
| 3. Offsite treatment | Treater may not have capacity to handle volumes to be treated in time allowed<br><br>Insufficient time for sampling, analysis, and negotiation | Will require drums or tanker trucks<br><br>Need characterization<br><br>Smaller volumes would enhance this alternative over Alt. 1<br><br>If need for shipment to more than one facility, increased management oversight needed |



EA0203

| Disposal Alternative | Possible Fatal Flaws | Comments |
|---|---|---|
| 4. Evaporation, residual disposal at hazardous waste landfill | Insufficient time for sampling, testing, evaporator fabrication/ mobilization, and operation<br><br>Air emission problems if volatile organics present in wastewater<br><br>WDOE may not allow this process onsite | Electricity needed for evaporator use<br><br>Need characterization<br><br>Net positive evaporation not feasible in this area because of rainfall levels<br><br>Residual requires disposal<br><br>May be used in combination with other alternatives<br><br>Bulking may be needed<br><br>Costly<br><br>Existing tanks could also be used for storage<br><br>Evaporation technology is in commercial use<br><br>Materials used to construct evaporator depend on concentration and type of corrosive<br><br>Characterization of wastewater and perhaps bench testing necessary for vendor to fabricate equipment |
| 5. Hazardous waste landfill disposal | None identified | Will require drums, tanker trucks, or solidification before transport<br><br>Compatibility of different materials may be a factor<br><br>Need characterization<br><br>May need solidification |

WASTE TYPE: B. Sludge from Corrosive Tanks
CONTAINERIZATION: Tanks and Pits

| Disposal Alternative | Possible Fatal Flaws | Comments |
|---|---|---|
| 1. Hazardous waste landfill | None identified | Hazardous waste sludge may need solidification prior to disposal depending on constituents in sludge<br><br>Compatibility of different materials may be a factor<br><br>Need characterization<br><br>May need solidification |
| 2. Drying or filtration and residue disposal at HW landfill | Depending on sludge characteristics, drying may not be technically feasible<br><br>Insufficient time for necessary testing<br><br>DOE may not allow this process onsite | Residual still requires disposal<br><br>Dryers are commercially available<br><br>Samples must be tested by vendor to determine reduction potential<br><br>Air emission, if volatiles contained in waste<br><br>Air discharge permit required (PSAPCA)<br><br>Corrosive sludge could require exotic materials of construction<br><br>May need sludge conditioning with lime fly ash, etc. Could use onsite waste solids |
| 3. Solidify and haul to hazardous waste landfill | Insufficient time for sampling and analysis<br><br>DOE may not allow this process onsite | Potential for use as solidification agent with other onsite waste solids<br><br>Will require drums or tanker trucks<br><br>Will minimize hazards during transport<br><br>Need characterization<br><br>Smaller volumes would enhance this alternative over Alt. 1<br><br>Adds volume, which may increase transport cost<br><br>Ratio of bulking agent to sludge must be determined (by lab tests) |

| Disposal Alternative | Possible Fatal Flaws | Comments |
|---|---|---|
| 4. Encapsulate and haul to nonhazardous waste landfill | Start-of-art technology with little practical use and high use costs<br><br>Waste would still be designated as hazardous waste requiring disposal at hazardous waste landfill<br><br>DOE may not allow this process onsite | Long-term effectiveness uncertain<br><br>May facilitate transport<br><br>Adds volume, which may increase transportation cost |
| 5. Neutralize and haul to nonhazardous waste landfill | Potential presence of hazardous substances<br><br>Insufficient time for sampling, analysis, and negotiation<br><br>DOE may not allow this process onsite | Increased volume for disposal<br><br>May have other substances requiring hazardous waste disposal<br><br>Adds volume, which increases transport cost |

WASTE TYPE: C. Isopropyl Alcohol Mixture
CONTAINERIZATION: Drums

| Disposal Alternative | Possible Fatal Flaws | Comments |
| --- | --- | --- |
| 1. Discharge to Metro (with or without treatment) | Substances above Metro discharge limits<br>Insufficient time for sampling, analysis, and negotiation<br>Metro may not accept discharge<br>DOE may not allow this process onsite | Sampling and analysis will be required before discharge<br>IPA is biodegradable; could bleed into sewer without problem<br>Potential for hazardous contamination<br>Requires repair or replacement of existing line to Metro sewer |
| 2. Onsite treatment and discharge to Mill Creek, residue to nonhazardous waste landfill | DOE may not allow discharge to Mill Creek<br>Insufficient time for sampling, analysis, bench testing, and treatment facility construction<br>DOE may not allow this process onsite | Sampling, analysis, and bench testing required<br>Onsite biological treatment plant probably required (at a minimum) |
| 3. Haul to offsite treatment facility | Treater may not have capacity to handle volumes to be treated in time allowed | Need characterization<br>May require drum repackaging and/or bulking prior to offsite removal<br>If need for shipment to more than one facility, increased management oversight needs |
| 4. Onsite evaporation, haul residue to nonhazardous waste landfill | Insufficient time for sampling, testing, evaporator fabrication/mobilization, and operation<br>Air emissions problems if volatile organics present<br>DOE may not allow this process onsite | May be used in combination with other alternatives<br>Potential for bulking needed<br>Costly<br>Existing tanks could also be used for storage<br>Evaporation technology is in commercial use<br>Electricity needed for evaporator use<br>Net positive evaporation not feasible in this area because of rainfall levels<br>Residual requires disposal<br>Need characterization |

| Disposal Alternative | Possible Fatal Flaws | Comments |
| --- | --- | --- |
| 5. Reuse | No market or use for waste<br><br>Potential contamination of material<br><br>Percent IPA too low for cost-effective reuse | No market in 1983<br><br>Potential for bulking or repackaging drums |
| 6. Hazardous waste landfill disposal | None identified | Potential for bulking or repackaging drums<br><br>Need characterization<br><br>May need solidification |
| 7. Nonhazardous waste landfill disposal | Potential presence of hazardous substances<br><br>Insufficient time for sampling, analysis, and negotiation<br><br>Municipal landfill may refuse to accept waste | Potential for bulking or drum repackaging<br><br>May require solidification<br><br>Need characterization<br><br>Potential long-term risk |

WASTE TYPE: D. Flue Dust
CONTAINERIZATION: Uncontained Bulk Waste Pile

| Disposal Alternative | Possible Fatal Flaws | Comments |
| --- | --- | --- |
| 1. Nonhazardous waste landfill disposal | Potential presence of hazardous substances<br><br>Municipal landfill may refuse to accept waste<br><br>Insufficient time for sampling, analysis, and negotiations | Potential airborne particulates in handling and transport; increased health and safety risk<br><br>Wetting and/or diapering of transport trailers needed to contain waste<br><br>Materials handling complications at landfill because of light-weight bulk material and air particulates<br><br>Unit hauling costs high due to light density<br><br>Potential use at landfill for sewage sludge solidification<br><br>Need additional analysis for acceptance at a landfill<br><br>Need characterization |
| 2. Hazardous waste landfill disposal | Permit restrictions may not allow use as a solidification agent for disposal facility | Potential airborne particulates in handling and transport; increased health and safety risk<br><br>Wetting and/or diapering of transport trailers needed to contain waste<br><br>Materials handling complications at landfill because of light-weight bulk material and air particulates<br><br>Unit hauling costs high due to light density<br><br>Need additional analysis for acceptance at a landfill<br><br>Use as solidification agent assumes storage availability at hazardous waste landfill |
| 3. Sale and reuse | May not be marketable for use in the Northwest<br><br>Insufficient time for sampling and negotiations<br><br>Sampling costs could be greater than value | Potential airborne particulates in handling and transport; increased health and safety risk<br><br>Wetting and/or diapering of transport trailers needed to contain waste<br><br>Materials handling complications at landfill because of light-weight bulk material and air particulates<br><br>Need characterization<br><br>May require temporary storage or staging area |

| Disposal Alternative | Possible Fatal Flaws | Comments |
| --- | --- | --- |
| 4. Onsite use as solidification agent | Solidification capability<br><br>DOE may not allow this process onsite | EP toxicity and perhaps other analyses must be conducted<br><br>Determination needed as to whether flue dust alone is capable of solidifying liquids and sludges at ratios cost-effective enough to be feasible<br><br>May need to mix flue dust with other solid to make it more readily used as solidification agent<br><br>Potential that increased volume of the mixed waste makes its use not feasible |
| 5. Codisposal at coal mine | Facility may not accept<br><br>Potential presence of hazardous substances<br><br>Insufficient time for sampling and negotiations | Low-cost alternative<br><br>Volumes of dust insignificant compared to ash generated from coal-fired plant<br><br>Responsibility for long-care left to power plant<br><br>Power perception risk to power plant to accepting wastes for disposal<br><br>Additional analysis required<br><br>Potential airborne particula in handling and transport; increased health and safety risk<br><br>Wetting and/or diapering of transport trailers needed to contain waste<br><br>Unit hauling costs high due to light density<br><br>Potential use at landfill for sewage sludge solidification |
| 6. Onsite use as containment material | Potential presence of hazardous substances<br><br>May not meet goals of surface cleanup<br><br>May not have value for final closure for Western Processing<br><br>May not be able to store materials on site until closure is conducted | Cheaper option than offsite transporting and disposal<br><br>Additional analysis required to determine the volume of contaminants present<br><br>EP toxicity and other analyses may be required |
| 7. Release to PRP appropriate disposal | PRP may not want waste | Need characterization<br><br>Waste may be mixed with other PRP wastes |

WASTE TYPE: E. Battery Chips
CONTAINERIZATION: Bulk Waste Pile

| Disposal Alternative | Possible Fatal Flaws | Comments |
| --- | --- | --- |
| 1. Hazardous waste landfill | | Common practice in Northwest<br><br>Need characterization |
| 2. Offsite recycler/ reclaimer | Potential for no recycler to accept material<br><br>Potential that reclaiming technology is not effective on this material<br><br>Recycling may logistically not be acceptable at Western Processing due to schedule and space constraints | Need additional testing<br><br>Probably no beneficial use<br><br>Possible volatile contamination<br><br>HNU detected volatiles in waste pile<br><br>EPA approached by recycling facilities<br><br>Determination still to be made on feasibility of recycling.<br><br>May require storage or staging area until such time as recycling can occur<br><br>Need for separating lead from plastic<br><br>Lead may be recycled and plastic burned |
| 3. Incineration | Capacity or throughput inadequate to accept waste within time frame for cleanup<br><br>Incinerator that will accept waste may not be available | Cement kiln potential use<br><br>Limited testing shows Btu value of 13,000 Btu/lb<br><br>Hog fuel boiler use reduced because of poor particulate control at end of system and potential of other contaminants being present in waste<br><br>Negotiation needed with cement kilns before final determination of feasibility<br><br>May require temporary storage onsite until kiln can burn wastes<br><br>Kiln will be able to take only the plastic portion of the waste<br><br>Potential to affect product quality<br><br>Additional testing needed for fuel characterization |

| Disposal Alternative | Possible Fatal Flaws | Comments |
| --- | --- | --- |
| 4. Nonhazardous waste landfill disposal | Potential presence of hazardous substances<br><br>Landfill may refuse to accept waste<br><br>Insufficient time for sampling, analysis, and negotiations | Potential airborne particulates in handling and transport; increased health and safety risk<br><br>Wetting and/or diapering of transport trailers needed to contain waste<br><br>Materials handling complications at landfill because of lightweight bulk materials and air particulates<br><br>Unit hauling costs high due to light density<br><br>Potential use at landfill for sewage sludge solidification<br><br>Need additional analysis for acceptance at a landfill<br><br>Need characterization |
| 5. Release to PRP, appropriate disposal | PRP may not want waste | Need characterization<br><br>Waste may be mixed with other PRP wastes |
| 6. Onsite use as solidification agent | May not have solidification capability<br><br>DOE may not allow onsite use of process | EP toxicity and perhaps other analyses must be conducted<br><br>Determination needed as to whether battery chips have components capable of solidifying liquids and sludges at ratios cost-effective enough to be feasible<br><br>May need to mix battery chips with other solids to make it more readily used as solidification agent<br><br>Increased volume of the mixed waste might make its use not feasible |

WASTE TYPE: F. Zinc Oxide
CONTAINERIZATION: Drums

| Disposal Alternative | Possible Fatal Flaws | Comments |
| --- | --- | --- |
| 1. Hazardous waste landfill disposal | None identified | Repackaging may be necessary<br>Need characterization<br>May need solidification |
| 2. Safe for recycle | No recycler may accept material<br>High potential for other hazardous materials in zinc oxide<br>Recycling technology not available in Northwest<br>Sampling and testing cost more than recycle value | Potential recyclers still to be identified and contacted<br>Waste likely contaminated<br>Additional analysis required<br>Market value of zinc is low<br>Drum repackaging and/or bulking may be required |
| 3. Onsite use as solidification agent | Solidification capability<br>Insufficient time for sampling and analysis<br>DOE may not allow onsite use of process | Drum handling and disposal<br>Need characterization<br>Determination of solidification capability needed<br>Potential for use as solidification agent with other onsite waste solids<br>Will minimize hazards during transport<br>Adds volume, which may increase transport cost |



EA0213

WASTE TYPE: G. Foaming Agent
CONTAINERIZATION: Drums

| Disposal Alternative | Possible Fatal Flaws | Comments |
|---|---|---|
| 1. Hazardous waste landfill disposal | Potentially no landfills will accept material<br><br>Potentially hazardous | Check each landfill's analysis requirements<br><br>Conditions of drums may require repackaging or bulking<br><br>Solidification of waste may make landfill disposal more feasible |
| 2. Sale for reuse | May be no interested parties<br><br>Insufficient time for sampling, analysis, and negotiation | Depends on nature of material (characterization required)<br><br>Condition of drums may require repackaging or bulking<br><br>Coast Guard stated that recyclable items were previously removed |
| 3. Discharge to Metro (with or without treatment) | Metro may not allow under discharge permit<br><br>Insufficient time for sampling, analysis, and testing | Slow bleed may be viable<br><br>Only liquid discharge may be viable<br><br>Solids, sludges, and empty drum portion remaining would still require landfill disposal<br><br>Considerable analysis requir |
| 4. Treat and discharge to Mill Creek, residue to non-hazardous waste landfill | DOE may not allow discharge to Mill Creek<br><br>Insufficient time for necessary sampling, analysis, testing, and treatment mobilization | Discharge permit unlikely<br><br>Sampling, analysis, and bench testing required<br><br>Solids, sludges, and empty drums still require disposal |
| 5. Hazardous waste landfill disposal | | Expensive alternative for waste<br><br>Solidification into bulk may reduce analysis costs for obtaining disposal approval<br><br>Solidification into bulk will depend on compatibility of waste combinations<br><br>Transport of wastes in drums may require prior repackaging with additional handling cost<br><br>Need characterization<br><br>May need solidification |
| 6. Return to manufacturer | Manufacturer may not accept material | May require repackaging<br><br>Need characterization |
| 7. Release to PRP, appropriate disposal | PRP may not want waste | Waste may be mixed with other PRP wastes |



EA0214

WASTE TYPE: H. Wood Pallets
CONTAINERIZATION: Bulk in Piles

| Disposal Alternative | Possible Fatal Flaws | Comments |
|---|---|---|
| 1. Onsite incineration | Insufficient time for sampling and analysis<br><br>Portable incinerator or onsite boiler may not be available | Contaminant potential in effluents from incineration may limit feasibility<br><br>May be extremely costly<br><br>Potential permitting restrictions<br><br>Potential use of onsite boiler<br><br>May end up with waste byproducts<br><br>Need characterization |
| 2. Offsite incineration | Unavailability of boiler and unacceptability of pallets at boiler<br><br>Insufficient time for necessary sampling, analysis, testing, and negotiation | Hog fuel boilers can burn pallets if proper emission control equipment is installed<br><br>May be needed for storage location until pallets can be burned<br><br>Negotiate perception of burning pallets with contamination<br><br>Need to crush and/or chip pallets<br><br>Analysis for PCB's required |
| 3. Nnonhazardous waste landfill disposal | Hazardous constituents<br><br>Not acceptable for disposal from public perception standpoint<br><br>Insufficient time for sampling and analysis<br><br>Landfills may not accept them | Need detailed characterization<br><br>Potential for separating clean pallets from dirty pallets |
| 4. Hazardous waste landfill disposal | None identified | Potential for visibly clean pallets with composite testing to be used as storage pallets onsite<br><br>Need characterization<br><br>Need to crush pallets prior to landfill disposal<br><br>May be more cost effective to crush pallets prior to transport |



EA0215

| Disposal Alternative | Possible Fatal Flaws | Comments |
| --- | --- | --- |
| 5. Reuse | May be no interested parties<br><br>Insufficient time for sampling and analysis | Need characterization<br><br>Marketability<br><br>Potential environmental exposure with reuse<br><br>Virtually impossible to remove all contamination |
| 6. No action | Contaminants present at least in great enough quantities to present hazard<br><br>Negative public perception may not allow disposal onsite | Remain onsite as cover material<br><br>Need characterization and potential for contaminants labeling<br><br>Long-term maintenance of site |
| 7. Use onsite as solidification agent | Inability to solidify waste | Crushing and chipping required<br><br>Characterization needed<br><br>May require considerable quantities of other solidification agents |

WASTE TYPE: I. Printing Inks, Tars, Oils, and Greases
CONTAINERIZATION: Drums

| Disposal Alternative | Possible Fatal Flaws | Comments |
|---|---|---|
| 1. Onsite evaporation, haul residue to landfill | Air pollution problems if volatile organics present<br><br>Climate not advantageous for solar evaporation<br><br>Insufficient time for sampling, analysis and testing and evaporator mobilization<br><br>DOE may not allow onsite use of this process | Expected solvents present; solvent recovery will be necessary<br><br>Potential need for drum packaging or solidification and bulk packaging<br><br>Concentrated contaminants may require hazardous waste disposal of residue<br><br>Bulking may be needed<br><br>Availability of evaporator and operational effectiveness of a suspected mix will affect selection<br><br>Net positive evaporation not feasible in this area because of rainfall level<br><br>Residual still requires disposal<br><br>Electricity needed for evaporator use<br><br>Need characterization and bench-scale testing<br><br>Existing tanks could also be used for storage<br><br>Evaporator technology is in commercial use |
| 2. Solidification and haul to hazardous waste landfill | Insufficient time for sampling and analysis | May only be viable for sludge, not liquid because of solidification ratio needed<br><br>May require additional drum handling and drum disposal<br><br>Ratio of bulking agent to sludge must be determined (by laboratory)<br><br>Need characterization<br><br>Will minimize hazards during transport |
| 3. Nonhazardous waste landfill disposal | May not be accepted because of inherent constituents of ink<br><br>Insufficient time for sampling, analysis, and negotiation | May contain heavy metals<br><br>Liquid sludge/solid form for disposal<br><br>Need characterization<br><br>Potential long-term risk |

| Disposal Alternative | Possible Fatal Flaws | Comments |
|---|---|---|
| 4. Hazardous waste landfill disposal | None identified | May require repackaging<br><br>May need solidification<br><br>Disposal restrictions may require use of drums versus bulk of liquids and possible solidification<br><br>Need characterization |
| 5. Offsite incineration | No availability of incinerator that will accept wastes<br><br>No availability of incineration unit in Northwest<br><br>Insufficient time for sampling, analysis, and negotiation | Use at-sea incineration for test burn possibly<br><br>Potential use in boilers<br><br>Need characterization<br><br>May require temporary storage onsite until incinerator can burn wastes |
| 6. Release to PRP, appropriate disposal | PRP may not want waste | Need characterization<br><br>Waste may be mixed with other PRP wastes |

WASTE TYPE: J. Tires
CONTAINERIZATION: None

| Disposal Alternative | Possible Fatal Flaws | Comments |
|---|---|---|
| 1. Clean and sell or give away | May be no interested parties<br><br>Insufficient time for characterization and negotiation | Need characterization<br><br>Potential risk of use<br><br>Need steam cleaning |
| 2. Steam clean, non-hazardous waste landfill disposal | Potential hazardous constituents<br><br>Insufficient time for characterization and negotiation<br><br>Cleaning not effective | Need characterization<br><br>Bulky shipment<br><br>Requires steam cleaning |
| 3. Hazardous waste landfill disposal | None identified | May need steam cleaning<br><br>Bulky shipment |
| 4. Offsite incineration | Unavailability of incinerator that will accept waste<br><br>Insufficient time for necessary sampling, testing, and negotiation | May be salable due to Zn content<br><br>Depends on availability of users and market value of recoverable fractions |

WASTE TYPE: K. Nail Coating
CONTAINERIZATION: Drums

| Disposal Alternative | Possible Fatal Flaws | Comments |
|---|---|---|
| 1. Treat and discharge to Metro, to non-hazardous waste landfill | Metro may not allow<br><br>Time constraints regarding characterization, testing, negotiation, and pretreatment facility<br><br>May contain organics in untreatable concentrations<br><br>DOE may not allow onsite use of this process | At a minimum may require heavy metals precipitation, filtration, pH adjustment<br><br>In addition bench and/or pilot testing may be required<br><br>Need characterization to determine if direct discharge is feasible<br><br>May need use of onsite storage to bulk and treat<br><br>Potential for hazardous residual |
| 2. Treatment and discharge to Mill Creek | DOE may not allow discharge to Mill Creek<br><br>Insufficient time for necessary sampling, analysis, testing, and treatment mobilization<br><br>DOE may not allow onsite use of this process | Same as Alternative 1<br><br>Discharge permits unlikely |
| 3. Hazardous waste landfill disposal | None identified | Drums may require repackaging or outer liner (overpack)<br><br>Liquid may need to be bulked and/or solidified prior to disposal<br><br>May need solidification<br><br>Need characterization |
| 4. Recycle | May be no interested parties<br><br>Potential non-recyclable material<br><br>Time constraints regarding characterization and negotiation | May be salable due to Zn content<br><br>Depends on availability of users and market value of recoverable fractions |
| 5. Offsite incineration | Unavailability of incinerator that will accept waste<br><br>Insufficient time for necessary sampling, testing, and negotiation | Need characterization<br><br>Potential for contaminants that would not allow for incineration |
| 6. Nonhazardous waste landfill disposal | Municipal landfill may refuse to accept waste<br><br>Insufficient time for sampling, analysis, and negotiation<br><br>Potential presence of hazardous substance | Need characterization<br><br>May require repackaging, bulking, solidification prior to disposal<br><br>Potential long-term risk |
| 7. Solidify and haul to hazardous waste landfill | None identified<br><br>DOE may not allow onsite use of this process | Solidification may be costly onsite and may be better done at hazardous waste facility |

WASTE TYPE: L. Unknowns (TZZO, Battery Chip Sludge From Shaker)
CONTAINERIZATION: Varied

| Disposal Alternative | Possible Fatal Flaws | Comments |
|---|---|---|
| 1. Offsite hazardous waste landfill | Unknown without characterization | Pb/PbO/PbSO4 suspect in battery chip sludge<br>Depends on waste type, contaminants, and characterization<br>May need repackaging |
| 2. Other technologies depending on further characterization | | Need characterization |

WASTE TYPE: M. Transformers
CONTAINERIZATION: One 7-Foot High Carcass (Empty Drained Flushed), Level >500 ppm
Two 4-Foot High Carcasses (Potentially Full), Level Unknown

| Disposal Alternative | Possible Fatal Flaws | Comments |
|---|---|---|
| 1. Hazardous waste landfill disposal<br><br>PCB contamination (greater than 500 ppm and between 50 and 500 ppm) | None identified | Could be need for temporary storage offsite prior to disposal if PCB storage capacity of facility has temporarily reached capacity<br><br>Liquid portion is either treated or incinerated by EPA-approved process or incinerator<br><br>Carcass will require draining and flushing with solvent prior to disposal<br><br>Carcasses should either be drained prior to shipment or have special packaging (i.e. crates)<br><br>Need for characterization (PCB content, solvent contamination type if present, flash point) |
| 2. Offsite incineration of liquids | | Carcass must be drained and solvent flushed prior to disposal at EPA-approved landfill |
| a) PCB contamination (level greater than 500 ppm) | | Oil to be transported in drums<br><br>Potential for mobile incinerator if available<br><br>Need to separate oil from carcass prior to shipment<br><br>Carcass will require draining prior to disposal |
| b) PCB contamination between 50 ppm and 500 ppm) | | Carcass to be disposed at EPA-approved landfill<br><br>Liquid can be incinerated but other alternatives may be more cost-effective |
| c) PCB contamination (less than 50 ppm) | | Carcass can be disposed at municipal landfill or recycled<br><br>Liquid can be burned as fuel additive |

| Disposal Alternative | Possible Fatal Flaws | Comments |
|---|---|---|
| 3. Offsite treatment and recycle | | |
| a) PCB contamination (level >500 ppm and 50 ppm <level <500 ppm) | | This quantity will limit treatment to offsite batching and then treatment |
| | | Treated oil at level <50 ppm can be used as fuel in boilers |
| | | Carcasses (at level >500 ppm) will require draining and flushing with solvent prior to disposal |
| b. PCB contamination (level <50 ppm) | | Carcasses (at 50 ppm >level <500 ppm) will require draining prior to disposal |
| | | Carcass can be broken down to use copper from internal workings |
| | | Scrap carcass can be disposed in municipal landfill |
| 4. Onsite treatment and recycle | DOE may not allow onsite use of this process | Mobile unit may not be available to treat waste |
| PCB contamination (any level) | | Small volume may not justify handling efforts |
| | | Expensive |
| 5. Onsite drain and flush, casings to nonhazardous waste landfill, incinerate liquids | | May be more cost-effective to dispose of without draining onsite |

WASTE TYPE: N. "Synfuels"
a) Bunker Oil
CONTAINERIZATION: Tanks and Bulk

| Disposal Alternative | Possible Fatal Flaws | Comments |
|---|---|---|
| 1. Incineration | Unavailability of incinerator that will accept waste | Possibility of companies with incinerator to take it at no cost, if has adequate BTU value |
| | Inadequate storage potential for wastes in quantities anticipated | Potential fire fumes from metal components in waste |
| | Insufficient time for sampling, analysis, and negotiation | Need characterization |
| | Presence of significant concentrations of heavy metals and halogines | |
| 2. Hazardous waste landfill disposal | No available landfarm | Facilities with no landfarms would solidify waste |
| | Questionable availability for storage prior to solidification if required | Cost of solidification expensive |
| | | Compatibility of different materials may be a factor |
| | | Need characterization |
| | | May need solidification |
| 3. Reuse as fuel | Presence of other hazardous waste constituents | May require temporary storage or staging area |
| | Insufficient time for sampling and negotiations | Need characterization |
| | Sampling costs may be greater than value | |
| | May be no interested parties | |

WASTE TYPE: N. "Synfuels"
b) High Arsenic Content
CONTAINERIZATION: Tanks/Bulk

| Disposal Alternative | Possible Fatal Flaws | Comments |
|---|---|---|
| 1. Dilute and recycle for pressure creosoting | May be no interested parties<br>Insufficient time for sampling, analysis, and negotiations | Currently used field operation<br>Need characterization<br>Arsenic levels required to be <5 ppm<br>Depends on form of arsenic |
| 2. Treat to remove As and reuse | Presence of other substances in unacceptable concentrations | Extensive bench testing<br>Unproven for this application |
| 3. Offsite incineration | Same as Alternative 1 in Waste Type P(a) | |
| 4. Hazardous waste landfill disposal | May contain levels high enough that landfills cannot accept material | Need characterization<br>May need solidification |

WASTE TYPE: N. "Synfuels"
c) Mixed Liquids
CONTAINERIZATION: Tanks and Bulk

| Disposal Alternative | Possible Fatal Flaws | Comments |
|---|---|---|
| 1. Same as Waste Type P(a) | Same as Waste Type P(a) | Same as Waste Type P(a) |

WASTE TYPE: N. "Synfuels"
c) Mixed Liquids
CONTAINERIZATION: Tanks and Bulk

| Disposal Alternative | Possible Fatal Flaws | Comments |
|---|---|---|
| 1. Same as Waste Type P(a) | Same as Waste Type P(a) | Same as Waste Type P(a) |

WASTE TYPE: N. "Synfuels"
e) Caustic Liquids
CONTAINERIZATION: Tanks and Drums

| Disposal Alternative | Possible Fatal Flaws | Comments |
|---|---|---|
| 1. Sell or give away for reuse | May not be marketable for use<br><br>Potential presence of other hazardous substances that would make selling infeasible | Need characterization<br><br>Probably not beneficial use |
| 2. Neutralize, solidify, and haul to nonhazardous waste landfill | Potential presence of other hazardous substances | Need characterization<br><br>May require more solidification agent than is cost-effective for use of alternative |
| 3. HW landfill disposal | May contain levels or contaminants not acceptable for pond (evaporation) disposal | Need characterization<br><br>May need solidification |



EA0227

WASTE TYPE: O. Gypsum Pile Mixed with Chromium
CONTAINERIZATION: Bulk

| Disposal Alternative | (to date) | Possible Fatal Flaws | Comments |
|---|---|---|---|
| 1. Hazardous waste landfill disposal | | None identified | Contents of pile are varied and include chromium streak<br>May need solidification<br>Constituents may be present in liquid that would require waste solidification<br>Need characterization |
| 2. Nonhazardous waste landfill disposal | | Potential for hazardous constituents | Less expensive than above |
| | | Insufficient time for sampling, analysis, and negotiation | Extensive sampling, analysis, and negotiations required |
| | | Municipal landfill may refuse to accept waste | |
| 3. Reuse as fill | | Hazardous materials may be present | Extensive sampling, analysis, and negotiations required |
| | | Market availability | |

WASTE TYPE: P. Fluids in Gypsum Pile
CONTAINERIZATION: Uncontained Bulk

| Disposal Alternative | (to date) | Possible Fatal Flaws | Comments |
|---|---|---|---|
| 1. Treat and discharge to Mill Creek, residue to hazardous waste landfill | | Presence of other substances in concentrations higher than discharge limits<br><br>Insufficient time for sampling, analysis, and negotiation<br><br>DOE may not allow discharge to Mill Creek | Low cost approach if not contaminated |
| 2. Discharge to Metro without treatment | | Substances above Metro discharge limits<br><br>Metro may not accept discharge<br><br>Insufficient time for sampling, analysis, and negotiation | Sampling and analysis will be required before discharge<br><br>Requires repair or replacement of existing line to Metro sewer |
| 3. Onsite treatment and discharge to Metro | | Metro may not allow discharge<br><br>Insufficient time for sampling, analysis, bench testing, and treatment mobilization | Treatment requirements unknown<br><br>Discharge permits questionable<br><br>Cost may be prohibitive if low volume of wastes<br><br>Sampling, analysis, and bench testing required |
| 4. Offsite treatment | | Treater may not have capacity to handle volumes to be treated in time allowed<br><br>Insufficient time for sampling, analysis, and negotiation<br><br>Metro may not allow under existing discharge permits | Need characterization<br><br>May require drum repackaging and/or bulking prior to off-site removal<br><br>Smaller volume would enhance the alternative over Alternatives 2 and 3 |
| 5. Hazardous waste landfill disposal | | Constituents present may eliminate potential to dispose in liquid form at landfill<br><br>Constituents present could alter the types of alternatives presented if analysis reveals contaminants that are not within the facilities permit | Constituents may be present in liquid that would require waste solidification<br><br>Need characterization |
| 6. Offsite incineration | | Insufficient time for sampling, analysis, and negotiation | Cost comparison needed with other alternatives |

WASTE TYPE: Q. Sludge from Bottoms of Tanks
CONTAINERIZATION: Tanks

| Disposal Alternative | Possible Fatal Flaws | Comments |
|---|---|---|
| 1. Hazardous waste landfill disposal | None identified | Hazardous waste sludge may need solidification prior to disposal depending on constituents in sludge<br>Need characterization |
| 2. Onsite drying or filtration with residue to hazardous waste landfill | May not be able to obtain air permit<br>Depending on sludge characteristics, drying may not be technically feasible<br>Insufficient time for necessary testing | Residual still requires disposal<br>Dryers are commercially available<br>Air emission potential<br>Air discharge permit required (PSAPCA)<br>May need sludge conditioning with lime, fly ash, etc. Could use onsite waste solids |
| 3. Solidify and haul to hazardous waste landfill | Constituents not appropriate for solidifying with other onsite wastes<br>Insufficient time for sampling and analysis | Potential for use as solidification agents with other onsite waste solids<br>Will minimize hazards during transport<br>Adds volume, which may increase transport cost<br>Ratio of bulking agent to sludge must be determined (by lab testing)<br>Need characterization |
| 4. Encapsulate and haul to hazardous waste landfill | State-of-art technology with little practical use and high use costs<br>Waste may still be designated a hazardous waste requiring disposal as hazardous waste landfill | Long-term effectiveness uncertain<br>May facilitate transport<br>More costly than Alternative 3<br>Adds volume, which may increase transportation cost |
| 5. Nonhazardous waste landfill disposal | Municipal landfill may refuse to accept waste<br>Insufficient time for sampling, analysis, and negotiation<br>May test as hazardous | Need characterization<br>May require solidification<br>Potential long-term risk |
| 6. Incinerate | Insufficient time for characterization and negotiation<br>Material may be unacceptable for incinerator | Potential high Btu content<br>Need characterization<br>Potential for contaminants at levels that would not allow for incineration |

WASTE TYPE: R. Tanks and Scrap Steel
CONTAINERIZATION:

| Disposal Alternative | Possible Fatal Flaws | Comments |
|---|---|---|
| 1. Haul to hazardous waste landfill | Limited to size of tanks and allowable dimensions for transport<br><br>Landfill dimension restrictions may limit size of tanks for disposal | Long-term site maintenance<br><br>Tanks should be filled with waste solids |
| 2. Cut and haul to hazardous waste landfill | | May reduce hauling and disposal cost<br><br>Long-term site maintenance |
| 3. Steam clean, cut, haul to hazardous waste landfill | Steam cleaning may not be able to remove all surface contaminants | Steam cleaning water will require disposal<br><br>Lowers risk level<br><br>Long-term site maintenance |
| 4. Steam clean, cut, and haul to nonhazardous waste landfill | Hazardous materials not removed by steam cleaning<br><br>Landfill may reject waste disposal<br><br>Insufficient time for sampling and negotiations | Steam cleaning water will require disposal<br><br>Lowers risk level<br><br>Check each landfill's analysis requirements |
| 5. Steam clean, sell whole and/or cut and sell to scrap dealer | Hazardous materials not removed by steam cleaning<br><br>May not be marketable for use<br><br>Insufficient time for sampling and negotiations<br><br>Facility may not have capacity to store volumes to be burned in time allowed<br><br>Unavailability of facility to accept waste | Steam cleaning water will require disposal<br><br>Facility ends up accepting some liability of materials burned |

WASTE TYPE: S. Ponded Water and Decontamination Water From Operations (e.g., tank cleaning, cleaning of cleanup equipment)
CONTAINERIZATION: Uncontained Bulk and Drums

| Disposal Alternative | Waste Profile (to date) | Possible Fatal Flaws | Comments |
|---|---|---|---|
| 1. Treatment and discharge to Metro | | Metro may not allow under discharge permits | Most likely filter/acidity/ carbon treatment required |
| | | Insufficient time for sampling, analysis, bench testing, and treatment facility construction | May be less expensive than offsite alternatives (depending on volume) |
| | | | Can use onsite tanks to neutralize |
| | | | Need to repair or replace existing line to Metro sewer |
| | | | Need characterization and bench tests |
| 2. Off-site treatment | | Treater may not have capacity to handle volumes to be treated in time allowed | Need characterization |
| 3. Hazardous waste landfill disposal | | Presence of contaminants not acceptable for liquid disposal, requiring prior solidification | Need characterization |
| | | | Compatibility of different materials may be a factor |
| | | | May need solidification |
| 4. Treat and discharge to Mill Creek | | DOE may not allow discharge to creek. | More stringent treatment requirement than discharge to Metro |
| | | Time may be insufficient to get NPDES permit | |
| 5. Solidify and haul to hazardous waste landfill disposal | | DOE may not allow this process onsite | Solidification may be costly onsite and better done at hazardous waste facility |

WASTE TYPE: T. Nonrecyclable Solvents
CONTAINERIZATION: Drums

| Disposal Alternative | Possible Fatal Flaws | Comments |
|---|---|---|
| 1. Hazardous waste landfill disposal | May not be accepted for liquid disposal, requiring solidification<br><br>Insufficient time for necessary sampling, testing, and negotiations | May need solidification prior to disposal<br><br>Need characterization<br><br>May require drum repackaging and/or bulking prior to offsite removal |
| 2. Offsite incineration | Possible unavailability of incinerator that will accept waste<br><br>Insufficient time for necessary sampling, testing, and negotiations | May need temporary storage<br><br>Need characterization<br><br>Possibly use at-sea incinerator for test burn<br><br>Potential for contaminants that would not allow for incineration |
| 3. Solidify and haul to hazardous waste landfill | Insufficient time for sampling and analysis<br><br>DOE may not allow this process onsite | Potential for use as solidification agent with other onsite wastes<br><br>Will minimize hazards during transport<br><br>Adds volume which may increase transport cost<br><br>Ratio of bulking agent to liquid must be determined (by lab tests)<br><br>Need characterization |
| 4. Offsite recycling facility | Possible unavailability of offsite recycler<br><br>Potentially insufficient volume and type of solvents available for recycling<br><br>Cost to recycle may be more expensive than other alternatives<br><br>Potentially no interested parties | Additional analysis needed to identify potential contaminants<br><br>Facilities may not have storage or processing capacity to handle treatment within time constraints<br><br>Depends on availability of users and market value of recoverable fractions |
| 5. Onsite incineration | Equipment may not be available<br><br>Insufficient time may be available to acquire necessary permits | Technology has been demonstrated only for a limited number of wastes |

WASTE TYPE: U. Crystallized Solids
CONTAINERIZATION: Rail Cars

| Disposal Alternative | Possible Fatal Flaws | Comments |
|---|---|---|
| 1. Hazardous waste landfill disposal | Constituents identified may make this alternative infeasible | Need characterization to evaluate alternative |
| 2. Others, depending on nature of material | Same as Alternative 1 | Need characterization to evaluate alternative |
| 3. Nonhazardous waste landfill disposal | Same as Alternative 1 | Need characterization to evaluate alternative |

WASTE TYPE: V. Laboratory Chemicals (unknown types)
CONTAINERIZATION: Varied

| Disposal Alternative | Possible Fatal Flaws | Comments |
|---|---|---|
| 1. Hazardous waste landfill disposal | Contaminants may cause alternatimes to be infeasible (e.g., explosives, radioactives) | Chemicals must be lab packed<br><br>Chemicals must be grouped by hazard, packaged in drums<br><br>Materials inventory required on packaging/drum<br><br>Labor intensive<br><br>Unlabeled materials will need to be sampled and analyzed |
| 2. Donate to local organization<br><br>-Company<br>-Research facility<br>-School | Contaminants may cause alternative to be infeasible | Need characterization<br><br>Potential risk if detailed analysis (100% content) not conducted for each container<br><br>Labor intensive to sample and analyze each container |
| 3. Offsite incineration | Contaminants causing alternative to be infeasible<br><br>Possible unavailability of incinerator that will accept waste<br><br>Insufficient time for necessary sampling, testing, and negotiation | Potential ability to burn in boilers<br><br>Need characterization |
| 4. Return to Manufacturer | Possible unavailability of manufacturer that will accept chemicals<br><br>Any chemicals in containers would require Alternative 1 | Manufacturer of chemical may accept return of chemicals<br><br>Labels may not be on container or identified manufacturers<br><br>May not need characterization of container with original labels if characteristics reflect the labeled chemical |
| 5. Detonation (explosives only) | | Explosives, reactives, oxidizes will require detonation rather than disposal, incineration, or donation<br><br>Hazards present until wastes identified, segregated, and detonated in controlled setting |
| 6. Solidify or treat, haul to hazardous waste landfill | DOE may not allow this process onsite | Chemical handling is difficult under field conditions |

WASTE TYPE: W. Pesticides
CONTAINERIZATION: Crates

| Disposal Alternative | Possible Fatal Flaws | Comments |
|---|---|---|
| 1. Hazardous waste landfill disposal | Insufficient time for sampling and analysis | May need repackaging prior to transporting<br><br>Need characterization for type of pesticide<br><br>Data not available to provide more detailed evaluation |
| 2. Offsite incineration | Insufficient time for sampling, analysis, and negotiation | May need repackaging prior to transporting<br><br>Need characterization for type of pesticide<br><br>Must be EPA-approved hazardous waste incinerator for specific pesticide types |

WASTE TYPE: X. Paint Wastes, Varnishes, and Stains
CONTAINERIZATION: Drums and Boxes

| Disposal Alternative | Possible Fatal Flaws | Comments |
|---|---|---|
| 1. Nonhazardous waste landfill disposal | Alternative not applicable if waste is flammable or contains hazardous constituents | Need characterization |
| 2. Hazardous waste landfill disposal | None identified | May need to be repackaged<br><br>May require solidification at landfill |
| 3. Offsite incineration | May not be available in Northwest, depending on waste characteristics<br><br>Insufficient time for sampling analyses and negotiation | Need characterization<br><br>May need to be repackaged for transport<br><br>May contain lead or zinc, which will require expensive stack gas cleanup |
| 4. Recycle | Not viable if paint waste does not contain about 75 percent usable solvent<br><br>Insufficient time for sampling, analysis, and negotiation | Need for separation of solid from liquid portion<br><br>Solid portion would be disposed of at municipal or hazardous waste landfill<br><br>Liquid portion could be recycled if marketable solvent has sufficient quantity to justify process |
| 5. Solidify, haul to nonhazardous waste landfill | DOE may not allow this process onsite<br><br>Insufficient time for sampling, analyses, and characterization<br><br>Testing may reveal results that make waste a hazardous material | Costs may not be substantially different from hazardous waste landfill disposal |

WASTE TYPE: Y. Flammable Fluids
CONTAINERIZATION: Drums

| Disposal Alternative | Possible Fatal Flaws | Comments |
| --- | --- | --- |
| 1. Offsite incineration | Possible unavailability of incinerator to accept waste<br><br>Insufficient time for sampling, analysis, and negotiation | May require temporary storage onsite until incinerator can burn wastes<br><br>Potential to affect product quality for industrial use incinerators<br><br>Need characterization |
| 2. Recycle | No market value for wastes<br><br>Insufficient time for sampling and negotiation<br><br>Sampling costs could be greater than value<br><br>Inadequate storage potential for wastes in quantities anticipated<br><br>Potential for no recycler to accept material | Need characterization<br><br>Potentially no beneficial use |
| 3. Hazardous waste landfill disposal | No storage capability at landfill would require solidification and/or drummed transport | Solidification required<br><br>Need characterization<br><br>Availability of storage capability to accept waste in bulk, or else material would need to be drummed |
| 4. Solidify, hazardous waste landfill disposal | Insufficient time for sampling and analysis | Potential for use mixed with other onsite compatible wastes<br><br>Need characterization and capability testing<br><br>Adds volume, which may increase transport cost |
| 5. Onsite incineration | Equipment may not be available<br><br>Insufficient time may be available to acquire necessary permits | Technology has been demonstrated only for a limited number of wastes |

WASTE TYPE: Z. Concrete Blocks

CONTAINERIZATION:

| Disposal Alternative | Possible Fatal Flaws | Comments |
|---|---|---|
| 1. Steam clean and use onsite in final closure | Cleaning not effective | Need characterization |
| | Insufficient time for characterization and/or cleaning | Need characterization |
| | CERCLA requirements may not allow onsite disposal as part of overall solution | Long-term site maintenance |
| 2. Steam clean, haul to nonhazardous waste landfill | Cleaning not effective | Need characterization |
| | Insufficient time for characterization and/or cleaning | Need steam cleaning |
| 3. Steam clean and reuse offsite | Cleaning not effective | Need characterization |
| | Insufficient time for characterization, cleaning, negotiation | Need steam cleaning |
| | May be no interested parties | Potential risk of use |
| 4. Hazardous waste landfill disposal | None identified | Bulky, heavy shipment |
| | | Long-term maintenance |

WASTE TYPE: AA. Demolition Debris
CONTAINERIZATION:

| Disposal Alternative | Possible Fatal Flaws | Comments |
|---|---|---|
| 1. Clean portions and recycle | Cleaning not effective | Need characterization |
| | Insufficient time for characterization and/or cleaning | Need steam cleaning |
| | Unacceptability of material by users | Potential risk of use |
| 2. Clean, haul to nonhazardous waste landfill | Cleaning not effective | Need characterization |
| | Insufficient time for characterization and/or cleaning | Need steam cleaning |
| | Landfill may refuse to accept waste | |
| 3. Clean and bury onsite later | CERCLA requirements may not allow onsite disposal as part of overall solution | Need characterization |
| | | Long-term site maintenance |
| | Cleaning not effective | |
| 4. Hazardous waste landfill disposal | None identified | Long-term site maintenance |
| 5. Offsite incineration | Insufficient time for characterization | Similar to Waste Type I, Alternative 2, pallets for wood and fiberglass-reinforced plastic material |
| | Local incinerator may not accept waste | |
| 6. Onsite incineration | | |



EA0240

WASTE TYPE: BB. Empty Drums
CONTAINERIZATION: Drums

| Disposal Alternative | Possible Fatal Flaws | Comments |
|---|---|---|
| 1. Hazardous waste landfill disposal | None identified | Long-term site maintenance<br>Drums could contain waste solids<br>Expensive |
| 2. Crush onsite, hazardous waste landfill disposal | Portable crusher probably not available | Drums could contain ignitable/explosive solids; need cleaning first<br>Very expensive |
| 3. Steam clean, sell to recycler | May not be able to clean all drums adequately<br>May not find offsite crusher with adequate capacity or recycle with adequate storage<br>Insufficient time for sampling and analysis<br>May not be marketable as scrap or whole | Recyclers require < 1 inch residual in drums<br>Safety concerns<br>Generates contaminated decon water<br>May result in spread of contamination from residuals |
| 4. Steam clean, nonhazardous waste landfill disposal | Some hazardous materials not removed by steam cleaning<br>Landfill may reject material<br>Insufficient time for sampling and negotiations | Generates contaminated decon water<br>Landfill analysis requirements<br>May result in long-term spread of contamination |



EA0241

APPENDIX D
**DETAILED RESULTS OF ALTERNATIVES SCREENING**

# RESULTS OF INITIAL SCREENING OF ALTERNATIVES

| Waste Type | Disposal Alternative | Engineering: Technical Feasibility | Engineering: Demonstrated Reliability | Engineering: Consistent w/ Project Needs | Engineering: Safety | Engineering: Schedule & Logistics | Economic: Capital Costs | Economic: O&M Costs | Economic: Total Cost | Environmental: Short-term Environmental Impact | Environmental: Long-term Environmental Impact | Environmental: Public Health Effects | Institutional: Public Acceptability | Institutional: Agency/Disposer Approvals | Institutional: Regulatory & Risk Concerns | Overall Ranking |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A. Corrosive Liquids | 1. Onsite treatment--discharge to Metro | ++ | + | ++ | + | - | o | + | o | o | o | o | + | - | + | o |
| | 2. Onsite treatment--discharge to Mill Creek | o | o | - | + | -- | -- | o | - | -- | - | - | - | -- | -- | - |
| | 3. Offsite treatment | + | + | + | o | -- | + | - | o | o | - | - | o | o | o | + |
| | 4. Evaporation, residual disposal at HW landfill | o | o | + | o | -- | -- | -- | -- | - | o | - | - | - | - | - |
| | 5. HW landfill disposal | ++ | ++ | + | o | + | + | -- | -- | + | o | + | o | o | + | o |
| B. Sludge from corrosive tanks | 1. HW landfill disposal | + | ++ | + | o | + | + | - | - | + | o | o | o | + | o | o |
| | 2. Drying or filtration and residue disposal at HW landfill | + | o | ++ | - | -- | - | + | o | o | o | + | o | - | + | o |
| | 3. Solidify and haul to HW landfill | ++ | ++ | ++ | o | o | o | - | o | | o | + | + | + | + | o |
| | 4. Encapsulate and haul to municipal landfill | o | -- | - | - | -- | -- | - | -- | + | + | + | + | - | + | - |
| | 5. Neutralize and haul to municipal landfill | - | - | + | o | -- | o | o | o | o | o | o | - | o | - | - |

## RESULTS OF INITIAL SCREENING OF ALTERNATIVES (cont.)

| Waste Type | Disposal Alternative | Engineering: Technical Feasibility | Engineering: Demonstrated Reliability | Engineering: Consistent w/ Project Needs | Engineering: Safety | Engineering: Schedule & Logistics | Economic: Capital Costs | Economic: O&M Costs | Economic: Total Cost | Environmental: Short-term Environmental Impact | Environmental: Long-term Environmental Impact | Environmental: Public Health Effects | Institutional: Public Acceptability | Institutional: Agency/Disposer Approvals | Institutional: Regulatory & Risk Concerns | Overall Ranking |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C. Isopropyl alcohol mixture | 1. Discharge to Metro (with or without treatment) | + | + | + | + | -- | o | + | + | + | o | o | o | - | o | o |
| | 2. Onsite treatment and discharge to Mill Creek, residue to municipal landfill | o | o | - | + | -- | -- | o | - | -- | - | - | -- | -- | -- | - |
| | 3. Haul to offsite treatment facility | + | + | + | o | - | + | - | o | + | - | - | + | o | o | + |
| | 4. Onsite evaporation, haul residual to municipal landfill | o | o | + | o | -- | -- | -- | -- | - | o | - | - | - | - | - |
| | 5. Reuse | - | - | + | o | -- | + | -- | -- | + | o | o | + | + | o | - |
| | 6. HW landfill disposal | ++ | ++ | + | o | + | + | -- | -- | + | o | o | o | o | + | o |
| | 7. Nonhazardous waste landfill disposal | + | o | o | - | -- | + | - | + | - | -- | - | - | -- | - | - |
| D. Flue dust | 1. Nonhazardous waste landfill disposal | + | - | o | - | -- | + | o | o | - | -- | - | - | -- | - | - |
| | 2. HW landfill disposal | ++ | + | + | o | + | + | -- | -- | + | o | o | + | + | + | o |
| | 3. Sale and reuse | o | - | + | - | -- | + | o | + | o | - | o | o | - | o | o |

RESULTS OF INITIAL SCREENING OF ALTERNATIVES (cont.)

| Waste Type | Disposal Alternative | Engineering: Technical Feasibility | Engineering: Demonstrated Reliability | Engineering: Consistent w/ Project Needs | Engineering: Safety | Engineering: Schedule & Logistics | Economic: Capital Costs | Economic: O&M Costs | Economic: Total Cost | Environmental: Short-term Environmental Impact | Environmental: Long-term Environmental Impact | Environmental: Public Health Effects | Institutional: Public Acceptability | Institutional: Agency/Disposer Approvals | Institutional: Regulatory & Risk Concerns | Overall Ranking |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 4. Onsite use as solidification agent | o | + | ++ | + | o | o | o | o | + | o | o | ++ | ++ | ++ | + |
| | 5. Codisposal at coal mine | - | - | - | o | -- | + | - | - | - | -- | - | - | - | -- | - |
| | 6. Onsite use as containment material | o | o | o | o | - | o | + | + | o | - | o | - | - | - | o |
| | 7. Release to potential responsible party (PRP), appropriate disposal | o | - | + | - | -- | + | + | + | + | o | o | + | o | 1 | o |
| E. Battery chips | 1. HW landfill disposal | ++ | ++ | + | + | + | + | -- | -- | + | o | + | + | + | + | o |
| | 2. Offsite recycler/reclaim | o | + | ++ | + | - | + | + | + | + | o | + | + | o | o | + |
| | 3. Incineration | o | o | + | o | -- | + | -- | - | o | + | o | o | - | o | - |
| | 4. Nonhazardous waste landfill disposal | - | - | - | - | -- | + | - | - | - | -- | - | -- | -- | - | - |
| | 5. Release to PRP, appropriate disposal | o | - | + | - | -- | + | + | + | + | o | o | + | o | - | o |
| | 6. Onsite use as solidification agent | - | - | + | o | - | + | - | - | + | o | o | + | o | o | - |

RESULTS OF INITIAL SCREENING OF ALTERNATIVES (cont.)

| Waste Type | Disposal Alternative | Engineering: Technical Feasibility | Engineering: Demonstrated Reliability | Engineering: Consistent w/ Project Needs | Engineering: Safety | Engineering: Schedule & Logistics | Economic: Capital Costs | Economic: O&M Costs | Economic: Total Cost | Environmental: Short-term Environmental Impact | Environmental: Long-term Environmental Impact | Environmental: Public Health Effects | Institutional: Public Acceptability | Institutional: Agency/Disposer Approvals | Institutional: Regulatory & Risk Concerns | Overall Ranking |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| F. Zinc oxide | 1. HW landfill disposal | ++ | ++ | + | + | + | + | -- | -- | + | o | o | + | + | + | o |
| | 2. Sale for recycle | o | - | + | - | -- | + | + | + | + | - | o | o | - | o | o |
| | 3. Onsite use as solidification agent | - | - | + | + | o | o | - | - | + | o | o | + | + | + | o |
| G. Foaming agent | 1. Nonhazardous waste landfill disposal | + | + | + | o | -- | + | o | + | + | - | - | - | -- | - | o |
| | 2. Sale for reuse | o | o | + | o | -- | + | + | + | + | - | o | + | - | - | o |
| | 3. Discharge to Metro (with or without pretreatment) | -- | -- | - | o | - | - | o | - | o | o | - | o | - | o | - |
| | 4. Treat and discharge to Mill Creek, residue to municipal landfill | -- | -- | -- | - | -- | -- | -- | -- | - | o | - | -- | -- | -- | - |
| | 5. HW landfill disposal | ++ | + | + | + | + | + | -- | -- | + | o | o | + | + | + | + |
| | 6. Return to manufacturer | o | - | + | - | -- | + | + | + | + | o | o | + | o | - | o |
| | 7. Release to PRP, appropriate disposal | o | - | + | - | -- | + | + | + | + | o | o | + | o | - | o |
| H. Wood pallets | 1. Onsite incineration | o | o | + | - | -- | o | -- | -- | - | + | o | - | - | o | - |
| | 2. Offsite Incineration | + | + | + | o | -- | + | o | o | o | + | o | - | - | o | - |

## RESULTS OF INITIAL SCREENING OF ALTERNATIVES (cont.)

| Waste Type | Disposal Alternative | Engineering: Technical Feasibility | Engineering: Demonstrated Reliability | Engineering: Consistent w/ Project Needs | Engineering: Safety | Engineering: Schedule & Logistics | Economic: Capital Costs | Economic: O&M Costs | Economic: Total Cost | Environmental: Short-term Environmental Impact | Environmental: Long-term Environmental Impact | Environmental: Public Health Effects | Institutional: Public Acceptability | Institutional: Agency/Disposer Approvals | Institutional: Regulatory & Risk Concerns | Overall Ranking |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 3. Nonhazardous waste landfill disposal | o | o | o | o | -- | + | o | o | o | - | - | -- | -- | -- | - |
| | 4. HW landfill disposal | ++ | + | + | + | + | + | o | o | o | - | - | -- | -- | -- | - |
| | 5. Reuse | o | o | + | o | -- | + | o | o | + | - | o | + | - | - | o |
| | 6. Use onsite as solidification agent | - | - | + | - | - | - | - | - | + | o | + | + | + | + | - |
| I. Printing inks, tars, oils and greases | 1. Onsite evaporation haul residual to landfill | - | - | + | - | -- | - | -- | -- | - | o | - | - | - | - | - |
| | 2. Solidification and haul to HW landfill | o | o | + | o | o | o | -- | -- | + | o | + | + | + | + | o |
| | 3. Nonhazardous waste landfill disposal | - | - | -- | - | -- | + | o | + | o | - | - | -- | -- | -- | - |
| | 4. HW landfill disposal | + | + | + | + | + | + | -- | -- | + | o | + | + | + | + | o |
| | 5. Offsite incineration | + | o | + | o | - | + | o | o | o | + | o | o | o | o | o |
| | 6. Release to PRP appropriate disposal | o | - | + | - | -- | + | + | + | + | o | o | + | o | - | o |

## RESULTS OF INITIAL SCREENING OF ALTERNATIVES (cont.)

| Waste Type | Disposal Alternative | Engineering | | | | | | Economic | | Environmental | | | Institutional | | Overall Ranking |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Technical Feasibility | Demonstrated Reliability | Consistent w/ Project Needs | Safety | Schedule & Logistics | Capital Costs | O&M Costs | Total Cost | Short-term Environmental Impact | Long-term Environmental Impact | Public Health Effects | Public Acceptability | Agency/Disposer Approvals | Regulatory & Risk Concerns | |
| J. Tires | 1. Clean and sell/give away | o | + | + | o | - | o | o | o | - | o | o | o | - | - | o |
| | 2. Steam clean, municipal landfill | o | + | + | o | - | o | o | o | o | o | - | o | - | - | o |
| | 3. HW landfill disposal | + | + | + | + | + | + | -- | -- | + | o | + | + | + | + | o |
| | 4. Offsite incineration | + | o | + | o | -- | o | - | - | o | + | o | o | -- | o | - |
| K. Nail coating | 1. Treat and discharge to Metro, residues to municipal landfill | - | - | + | o | - | - | o | - | o | o | o | - | - | - | - |
| | 2. Treat and discharge to Mill Creek, residue to municipal landfill | -- | -- | - | - | -- | -- | - | -- | - | - | - | -- | -- | - | - |
| | 3. HW landfill disposal | + | + | + | + | + | + | -- | -- | + | o | + | + | + | + | + |
| | 4. Recycle | o | o | ++ | o | -- | + | o | + | + | - | - | + | - | o | o |
| | 5. Offsite incineration | o | - | + | o | - | + | o | o | o | + | o | o | - | o | o |
| | 6. Nonhazardous waste landfill disposal | o | - | o | - | -- | + | o | + | o | - | - | - | -- | - | - |

RESULTS OF INITIAL SCREENING OF ALTERNATIVES (cont.)

| Waste Type | Disposal Alternative | Engineering: Technical Feasibility | Engineering: Demonstrated Reliability | Engineering: Consistent w/ Project Needs | Engineering: Safety | Engineering: Schedule & Logistics | Economic: Capital Costs | Economic: O&M Costs | Economic: Total Cost | Environmental: Short-term Environmental Impact | Environmental: Long-term Environmental Impact | Environmental: Public Health Effects | Institutional: Public Acceptability | Institutional: Agency/Disposer Approvals | Institutional: Regulatory & Risk Concerns | Overall Ranking |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 7. Solidify and haul to hazardous waste landfill | o | o | + | o | o | o | -- | -- | + | o | + | + | + | + | o |
| L. Unknowns | 1. Offsite HW landfill | | | | | | | | | | | | | | | o |
| | 2. Other tech. depending on characterization | (Insufficient information) | | | | | | | | | | | | | | o |
| M. Transformers | 1. HW landfill disposal | (Depending on characterization, all are potentially + for relatively small volumes such as these) | | | | | | | | | | | | | | + |
| | 2. Offsite incineration of liquids | | | | | | | | | | | | | | | + |
| | 3. Offsite treatment and recycle | | | | | | | | | | | | | | | + |
| | 4. Onsite treatment and recycle | | | | | | | | | | | | | | | + |
| | 5. Onsite drain and flush, casings to municipal landfill, incinerate liquids | | | | | | | | | | | | | | | + |
| N. "Synfuels" a) Bunker oil | 1. Incineration | + | o | + | o | - | + | - | - | o | + | o | o | - | o | o |
| | 2. HW landfill disposal | + | + | + | + | + | + | -- | -- | + | o | + | + | + | + | o |
| | 3. Reuse as fuel | o | o | ++ | o | -- | + | o | + | - | + | - | o | - | - | o |

## RESULTS OF INITIAL SCREENING OF ALTERNATIVES (cont.)

| | | Engineering | | | | | Economic | | | Environmental | | | Institutional | | | Overall Ranking |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Waste Type | Disposal Alternative | Technical Feasibility | Demonstrated Reliability | Consistent w/ Project Needs | Safety | Schedule & Logistics | Capital Costs | O&M Costs | Total Cost | Short-term Environmental Impact | Long-term Environmental Impact | Public Health Effects | Public Acceptability | Agency/Disposer Approvals | Regulatory & Risk Concerns | |
| b) High as content | 1. Dilute and recycle for pressure creosoting | o | o | + | o | -- | + | o | o | + | o | o | + | - | - | o |
| | 2. Treat to remove As and reuse | - | - | o | - | -- | -- | - | -- | o | o | o | + | - | - | - |
| | 3. Offsite incineration | o | + | + | o | - | + | - | - | o | o | - | - | - | o | o |
| | 4. HW landfill disposal | + | + | + | + | + | + | -- | -- | + | o | + | + | + | + | o |
| c) Mixed liquids | (Same as Item a) | | | | | | | | | | | | | | | |
| d) Liquids with MeCl | 1. Onsite treatment and discharge to Metro | o | - | + | - | -- | -- | -- | -- | - | - | - | - | -- | - | - |
| | 2. Offsite treatment for recycling | o | o | + | o | -- | o | - | o | o | o | o | + | o | - | o |
| | 3. Offsite incineration | o | o | + | o | -- | o | o | o | o | + | o | o | - | - | o |
| | 4. HW landfill disposal | + | + | + | + | o | o | -- | -- | + | o | + | + | + | o | o |
| e) Caustic liquids | 1. Sell or give away for reuse | o | o | + | o | -- | + | o | o | + | - | o | o | - | - | o |
| | 2. Neutralize, solidify and haul to municipal landfill | - | - | + | -- | -- | o | - | o | + | - | o | - | - | - | - |
| | 3. HW landfill disposal | + | + | + | o | + | + | -- | -- | + | o | o | + | + | + | o |

## RESULTS OF INITIAL SCREENING OF ALTERNATIVES (cont.)

| Waste Type | Disposal Alternative | Engineering: Technical Feasibility | Engineering: Demonstrated Reliability | Engineering: Consistent w/ Project Needs | Engineering: Safety | Engineering: Schedule & Logistics | Economic: Capital Costs | Economic: O&M Costs | Economic: Total Cost | Environmental: Short-term Environmental Impact | Environmental: Long-term Environmental Impact | Environmental: Public Health Effects | Institutional: Public Acceptability | Institutional: Agency/Disposer Approvals | Institutional: Regulatory & Risk Concerns | Overall Ranking |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| O. Gypsum pile | 1. HW landfill disposal | + | + | + | + | + | + | -- | -- | + | o | + | + | + | o | + |
| | 2. Nonhazardous waste landfill disposal | + | o | + | + | -- | + | o | o | + | - | o | - | - | - | o |
| | 3. Reuse as fill | - | - | + | - | -- | + | - | o | - | -- | - | -- | -- | -- | - |
| P. Fluids in gypsum pile | 1. Treat and discharge to Mill Creek, residue to hazardous waste landfill | o | - | - | o | -- | -- | - | - | - | - | - | -- | -- | -- | - |
| | 2. Discharge to Metro (without treatment) | o | - | o | o | - | + | + | + | - | o | o | - | - | - | - |
| | 3. Treat and discharge to Metro | + | o | + | + | -- | - | o | o | o | o | + | + | o | o | o |
| | 4. Offsite treatment | + | + | + | + | - | + | - | - | o | - | o | o | o | - | o |
| | 5. HW landfill disposal | + | + | + | o | + | + | -- | -- | + | o | + | + | + | + | o |
| | 6. Offsite incineration | + | + | + | o | -- | + | -- | -- | o | + | o | o | - | + | - |
| Q. Sludge from bottom of tanks | 1. HW landfill disposal | + | ++ | + | o | + | + | -- | - | + | o | o | o | + | o | o |
| | 2. Onsite drying or filtration and residue disposal at HW landfill | + | o | ++ | - | -- | - | + | o | o | o | + | o | - | + | o |

## RESULTS OF INITIAL SCREENING OF ALTERNATIVES (cont.)

| Waste Type | Disposal Alternative | Engineering: Technical Feasibility | Engineering: Demonstrated Reliability | Engineering: Consistent w/ Project Needs | Engineering: Safety | Engineering: Schedule & Logistics | Economic: Capital Costs | Economic: O&M Costs | Economic: Total Cost | Environmental: Short-term Environmental Impact | Environmental: Long-term Environmental Impact | Environmental: Public Health Effects | Institutional: Public Acceptability | Institutional: Agency/Disposer Approvals | Institutional: Regulatory & Risk Concerns | Overall Ranking |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 3. Solidify and haul to offsite HW landfill | ++ | ++ | ++ | o | o | o | - | o | + | o | + | + | + | + | o |
| | 4. Encapsulate and haul to offsite HW landfill | o | -- | - | - | -- | - | - | -- | + | + | + | + | - | + | - |
| | 5. Nonhazardous waste landfill disposal | o | + | o | - | -- | + | + | + | - | -- | - | -- | -- | - | - |
| | 6. Offsite incineration | -- | - | + | o | -- | - | o | - | o | + | o | o | -- | - | - |
| | 7. Onsite incineration | -- | - | o | - | -- | o | -- | -- | o | + | o | o | - | - | - |
| R. Tanks and scrap steel | 1. Haul as is to HW landfill | + | + | + | + | o | + | -- | -- | + | o | o | o | o | o | o |
| | 2. Cut and haul to HW landfill | + | + | + | - | + | + | -- | -- | + | o | + | + | o | o | - |
| | 3. Steam clean, cut and haul to HW landfill | + | + | + | o | o | + | -- | -- | o | o | o | + | o | o | - |
| Note: Water from steam cleaning requires treatment and disposal | 4. Steam clean, cut and haul to municipal landfill | o | o | + | o | - | + | o | o | o | o | o | - | - | - | o |
| | 5. Steam clean, sell whole and/or cut and sell as scrap | o | + | + | o | o | + | + | + | o | o | o | o | o | - | + |

## RESULTS OF INITIAL SCREENING OF ALTERNATIVES (cont.)

| Waste Type | Disposal Alternative | Engineering: Technical Feasibility | Engineering: Demonstrated Reliability | Engineering: Consistent w/ Project Needs | Engineering: Safety | Engineering: Schedule & Logistics | Economic: Capital Costs | Economic: O&M Costs | Economic: Total Cost | Environmental: Short-term Environmental Impact | Environmental: Long-term Environmental Impact | Environmental: Public Health Effects | Institutional: Public Acceptability | Institutional: Agency/Disposer Approvals | Institutional: Regulatory & Risk Concerns | Overall Ranking |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S. Ponded water and decon water from operations | 1. Treat and discharge to Metro | o | o | + | o | -- | - | o | - | o | o | o | + | - | o | o |
| | 2. Offsite treatment | + | + | + | + | - | + | - | - | o | - | - | o | - | - | o |
| | 3. HW landfill disposal | ++ | + | + | + | + | + | -- | -- | + | o | + | + | + | + | o |
| | 4. Treat and discharge to Mill Creek | o | o | - | + | -- | -- | o | - | -- | - | - | - | - | - | - |
| | 5. Solidify, haul to HW landfill | + | o | o | o | -- | o | -- | -- | + | o | o | + | + | + | - |
| T. Nonrecyclable solvents | 1. HW landfill disposal | + | + | + | + | + | + | -- | -- | + | o | + | + | + | + | o |
| | 2. Incinerator | o | o | + | o | -- | + | - | - | o | + | o | o | o | o | o |
| | 3. Solidify and haul to HW landfill | + | + | + | + | + | + | -- | -- | + | o | + | + | + | + | o |
| | 4. Offsite recycler | o | o | + | o | -- | + | - | o | + | - | - | o | - | - | - |
| | 5. Onsite incineration | o | o | + | - | -- | o | -- | -- | - | + | o | - | - | - | - |
| U. Crystallized solids | 1. HW landfill disposal | + | + | + | + | + | + | -- | -- | + | o | + | + | + | + | o |
| | 2. Others, depending on nature of material | o | o | o | o | -- | o | o | o | o | o | o | o | o | o | o |
| | 3. Nonhazardous waste landfill disposal | o | o | + | - | -- | + | o | o | o | - | - | - | - | - | - |

## RESULTS OF INITIAL SCREENING OF ALTERNATIVES (cont.)

| Waste Type | Disposal Alternative | Engineering: Technical Feasibility | Engineering: Demonstrated Reliability | Engineering: Consistent w/ Project Needs | Engineering: Safety | Engineering: Schedule & Logistics | Economic: Capital Costs | Economic: O&M Costs | Economic: Total Cost | Environmental: Short-term Environmental Impact | Environmental: Long-term Environmental Impact | Environmental: Public Health Effects | Institutional: Public Acceptability | Institutional: Agency/Disposer Approvals | Institutional: Regulatory & Risk Concerns | Overall Ranking |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| V. Laboratory chemicals | 1. HW landfill disposal | + | + | + | + | o | + | -- | -- | + | o | + | + | + | + | o |
| | 2. Donate to local org. | - | - | + | - | -- | + | o | o | - | -- | -- | -- | -- | -- | - |
| | 3. Offsite incineration | o | o | o | - | -- | + | - | - | o | + | o | o | - | o | - |
| | 4. Return to manufacturer | o | - | + | o | -- | + | o | o | o | - | - | o | -- | - | - |
| | 5. Detonation (explosives only) | + | + | + | - | - | o | - | - | o | + | o | - | - | - | o |
| | 6. Solidify or treat, haul to HW landfill | + | o | o | - | -- | o | - | - | + | o | o | + | + | + | - |
| W. Pesticides in crates | 1. HW landfill disposal | + | + | + | + | o | + | -- | -- | + | o | + | + | + | + | o |
| | 2. Offsite incineration | - | o | + | o | - | + | - | - | o | + | o | o | o | o | o |
| X. Paint waste, varnishes, and stains | 1. Nonhazardous waste landfill disposal | - | - | + | o | -- | + | o | o | + | - | - | - | - | - | - |
| | 2. HW landfill disposal | + | + | + | + | + | + | -- | -- | + | o | + | - | + | o | o |
| | 3. Offsite incineration | o | + | + | o | - | + | - | - | o | + | o | o | o | o | o |
| | 4. Recycle | o | + | + | o | -- | + | o | o | o | - | - | - | - | - | - |
| | 5. Solidify, haul to municipal landfill | + | o | o | - | - | o | -- | -- | + | o | + | o | + | o | - |

RESULTS OF INITIAL SCREENING OF ALTERNATIVES (cont.)

| Waste Type | Disposal Alternative | Engineering: Technical Feasibility | Engineering: Demonstrated Reliability | Engineering: Consistent w/ Project Needs | Engineering: Safety | Engineering: Schedule & Logistics | Economic: Capital Costs | Economic: O&M Costs | Economic: Total Cost | Environmental: Short-term Environmental Impact | Environmental: Long-term Environmental Impact | Environmental: Public Health Effects | Institutional: Public Acceptability | Institutional: Agency/Disposer Approvals | Institutional: Regulatory & Risk Concerns | Overall Ranking |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Y. Flammable liquids | 1. Offsite incineration | + | + | + | o | - | + | - | - | o | + | o | o | - | o | o |
| | 2. Recycle | o | + | + | o | -- | + | o | o | o | - | - | - | - | - | - |
| | 3. HW landfill disposal | + | + | + | + | + | + | -- | -- | + | o | + | + | + | + | o |
| | 4. Solidify, HW landfill | ++ | + | + | + | + | + | -- | -- | + | o | + | + | + | + | o |
| | 5. Onsite incineration | o | o | + | - | -- | o | -- | -- | - | + | o | - | - | - | - |
| Z. Concrete blocks | 1. Steam clean and use onsite in final closure | o | o | o | o | - | + | + | + | o | - | o | -- | - | - | o |
| | 2. Steam clean, haul to nonhazardous landfill | - | - | + | o | -- | + | o | + | + | - | - | - | -- | - | - |
| | 3. Steam clean and reuse offsite | - | - | + | - | -- | + | o | o | o | -- | -- | o | -- | -- | - |
| | 4. HW landfill disposal | + | + | + | + | + | ++ | -- | -- | + | o | + | + | + | + | o |
| A. Demolition debris | 1. Clean portions and recycle | - | - | + | - | -- | + | o | o | o | -- | -- | o | -- | -- | - |
| | 2. Clean, haul to municipal landfill | - | - | + | o | -- | + | o | o | + | - | - | - | -- | - | - |
| | 3. Clean and bury onsite later | o | o | o | o | - | + | + | + | o | - | o | -- | - | - | o |

## RESULTS OF INITIAL SCREENING OF ALTERNATIVES (cont.)

| Waste Type | Disposal Alternative | Engineering | | | | | Economic | | | Environmental | | | Institutional | | | Overall Ranking |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Technical Feasibility | Demonstrated Reliability | Consistent w/ Project Needs | Safety | Schedule & Logistics | Capital Costs | O&M Costs | Total Cost | Short-term Environmental Impact | Long-term Environmental Impact | Public Health Effects | Public Acceptability | Agency/Disposer Approvals | Regulatory & Risk Concerns | |
| | 4. HW landfill disposal | + | + | + | + | + | + | -- | -- | + | o | + | + | + | + | o |
| | 5. Offsite incineration | + | + | + | o | -- | + | o | o | o | + | o | + | - | o | o |
| | 6. Onsite incineration | -- | - | o | - | -- | o | -- | -- | o | + | o | + | o | + | - |
| BB. Empty Drums | 1. Haul to HW landfill | + | + | + | + | + | + | -- | -- | + | o | o | + | + | + | o |
| | 2. Crush onsite and haul to HW landfill disposal | - | - | + | - | -- | o | -- | -- | + | o | o | + | + | + | - |
| | 3. Steam clean, sell to recycle | o | + | + | o | - | o | + | + | + | o | o | + | o | o | o |
| | 4. Steam clean, municipal landfill | - | o | o | o | -- | o | o | o | o | o | o | - | - | - | - |

# RESULTS OF SECOND SCREENING

Western Processing Alternatives Analysis

| Waste Type | Disposal Alternative | Approx. Cost Savings vs. Offsite Haz. Waste Landfill ($000) | Approx. Cost To Devel. Suf. Information for Implementation (as % of Cost Sav.) | Estimated Time Required for Implementation (Months) | Comments |
|---|---|---|---|---|---|
| A. Corrosive liquids | 1. Onsite treatment and discharge to Metro | $0-$10 | 60% | 2 | Potentially feasible only as part of overall aqueous waste cleanup |
| | 2. Haul to offiste treatment facility | 0-10 | 30% | 1 | Same as 1 |
| | 3. Haul to H.W. Landfill | N.A. | | 1 | Probably not economical or necessary |
| B. Sludge from corrosive tanks | 1. Haul to H.W. Landfill | N.A. | | 1 | |
| | 2. Onsite drying or filtration and residue disposal at H.W. Landfill | (0 | N.A. | 1 | Not economical |
| | 3. Solidify and haul to H.W. Landfill | (0 | N.A. | 1 | Uneconimical, unless appropriate dry, lightweight, |
| C. IPA mixture | 1. Assume onsite treatment | (0 | N.A. | 2 | Same as A |
| | 2. Haul to off-site treatment facility | 0-10 | 600 | 1 | Same as A |
| | 3. Haul to H.W. Landfill | N.A. | | 1 | Same as A |
| D. Flue Dust | 1. Haul to H.W. Landfill | N.A. | | 1 | |
| | 2. Sale for reuse | 100-200 | 30% | | May not be able to find a buyer, high risk of contamination |
| | 3. On-site use as solidification agent, haul to H.W. Landfill | 10-50 | 5% | 2 | Only possible if material is dry (in fact, appears saturated) |
| | 4. On-site use in final site closure | )200 | 10% | )3 | Only possible if final closure plans include onsite containment of hazardous wastes |
| | 5. Release to PRP | )200 | 10% | 3 | Negotiations could become protracted |
| E. Battery Chips | 1. Offsite H.W. Landfill | N.A. | | | |
| | 2. Offsite recycler/reclaimer | 100-200 | 5% | 1-2 | Attractive, assumes a 10% lead content in the recycled goods |
| | 3. Incineration | (0 | N.A. | 1-2 | Uneconomical. Nearest hazardous waste incinerators for solids in Midwest |
| | 4. Release to PRP | )100 | 10% | 3 | Negotiations could become protracted |

Western Processing Alternatives Analysis

| Waste Type | Disposal Alternative | Approx. Cost Savings vs. Offsite Haz. Waste Landfill ($000) | Approx. Cost To Devel. Suf. Information for Implementation (as % of Cost Sav.) | Estimated Time Required for Implementation (Months) | Comments |
|---|---|---|---|---|---|
| F. Zinc Oxide | 1. Offsite H.W. Landfill | N.A. | | 1 | |
| | 2. Recycle | (0 | | 3 | Uneconomical. Approximately 400 separate containers to characterize |
| G. Foaming agent | 1. Municipal landfill | (0 | N)A. | 2 | Uneconomical |
| | 2. Sale for reuse | (0 | N)A. | 2-3 | Uneconomical |
| | 3. Offsite H.W. Landfill | N.A. | | 1 | |
| | 4. Return to manufacturer | 0-10 | | 3 | Negotiations could become protracted |
| | 5. Release to PRP | 0-10 | | 3 | Negotiations could become protracted |
| H. Wood pallets | 1. Offsite incineration | (0 | N.A. | 3 | Assumes nails must be manually removed from pallets |
| | 2. Offsite H.W. Landfill | N.A. | | 1 | Low density of unchipped pallets adds to hauling charge |
| | 3. Use on-site as solidification agent | (0 | N.A. | 3 | Assumes pallets must be de-nailed and chipped |
| I. Printing Inks, tars, oils & greases | 1. Solidification and offsite H.W. Land-fill | (0 | N.A. | 1 | Uneconomical, unless appropriate dry, light, hazardous solidifying agents available onsite |
| | 2. Offsite H.W. Landfill | N.A. | | 1 | |
| | 3. Offsite Incineration | (0 | N.A. | 1 | Uneconomical, unles incinerator charges can be reduced significantly |
| | 4. Release to PRP | 0-10 | | 3 | Negotiatiations could become protracted |

Western Processing Alternatives Analysis

| Waste Type | Disposal Alternative | Approx. Cost Savings vs. Offsite Haz. Waste Landfill ($000) | Approx. Cost To Devel. Suf. Information for Implementation (as % of Cost Sav.) | Estimated Time Required for Implementation (Months) | Comments |
|---|---|---|---|---|---|
| J. Tires | 1. Clean & sell/give away | 0-10 | 10% | 1 | Steam clean assumed effective |
| | 2. Steam clean, municipal landfill | 0-10 | 20% | 1 | Steam clean assumed effective |
| | 3. Offsite H.W. Landfill | N.A. | | 1 | |
| | 4. Offsite incineration | 0-10 | 100% | 2 | Additional labor and time required to find interested party and prepare legal information |
| K. Nail Coating | 1. Offsite H.W. Landfill | N.A. | | 1 | |
| | 2. Recycle | <0 | N.A. | 1 | Uneconomical |
| | 3. Offsite incineration | <0 | N.A. | 1 | Uneconomical, assuming incineration as a hazardous waste |
| | 4. Solidify & haul to H.W. Landfill | <0 | N.A. | 2 | Uneconomical |
| L. Unknowns | 1. Offsite H.W. Landfill | | | | Insufficient information for screening |
| | 2. Other tech. depending on characterization | | | | |
| M. Transformers | 1. Offsite H.W. Landfill | N.A. | | 1 | May be allowed if PCB levels do not exceed 50ppb |
| | 2. Offsite treat & recycle | N.A. | | 1 | May be required if PCB levels indicate need |
| | 3. Onsite treat liquid & recycle casings | <0 | N.A. | 2 | Small volume of transformers (3) and unknown PCB content make cleaning of transformers and recycle of fluids and transformer expensive |
| | 4. Onsite drain, flush, casing to municipal landfill, incinerate liquids | <0 | N.A. | 2 | |
| N. "Synfuels" a) 60 weight Bunker oil | 1. Incineration | <0 | N.A. | 1 | Uneconomical, assuming incineration as a hazardous waste |
| | 2. Offsite H.W. Landfill | N.A. | | 1 | |
| | 3. Reuse as fuel | >200 | 15% | 2 | Attractive, assuming a user can be found |

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Western Processing Alternatives Analysis

| Waste Type | Dispos | prox. Cost avings vs. fsite Haz. te Landfill ($000) | Approx. Cost To Devel. Suf. Information for Implementation (as % of Cost Sav.) | Estimated Time Required for Implementation (Months) | Comments |
|---|---|---|---|---|---|
| F. Zinc Oxide | 1. Offsite H.W. l | N.A. | | 1 | |
| | 2. Recycle | (0 | | 3 | Uneconomical. Approximately 400 separate containers to characterize |
| G. Foaming agent | 1. Municipal lan | (0 | N)A. | 2 | Uneconomical |
| | 2. Sale for reus | (0 | N)A. | 2-3 | Uneconomical |
| | 3. Offsite H.W. | N.A. | | 1 | |

Western Processing Alternatives Analysis

| Waste Type | Disposal Alternative | Approx. Cost Savings vs. Offsite Haz. Waste Landfill ($000) | Approx. Cost To Devel. Suf. Information for Implementation (as % of Cost Sav.) | Estimated Time Required for Implementation (Months) | Comments |
|---|---|---|---|---|---|
| R. Tanks & scrap metal | 1. Haul to H.W. Landfill | N.A. | | 1-2 | Probably not economical or necessary |
| | 2. Steam clean, cut & haul to municipal landfill | <0 | N.A. | | Not economical |
| | 3. Steam clean, and sell whole or cut & sell as scrap | 50-100 | 10% | | Attractive, but could be logistically difficult |
| S. Pond water and Decon water from operations | 1. Onsite treat & discharge to Metro | 100-200 | 2 | 2 | Same as A (This is the large-volume aqueous waste that, when combined with others, could make on-site treatment attractive) |
| | 2. Offsite treatment | 100-200 | 1 | 1 | Same as A |
| | 3. Offsite H.W. Landfill | N.A. | | 1 | Same as A |
| T. Nonrecycleable solvents in drums | 1. Offsite H.W. Landfill | N.A. | | 1 | |
| | 2. Offsite incinerator | <0 | N.A. | 1 | Uneconomical, assuming inceneration as a hazardous waste |
| | 3. Solidify & haul to H.W. Landfill | <0 | N.A. | 1-2 | Uneconomical, unless appropriate dry, light hazardous solidifing agents are available on site |
| U. Crystallized solids in rail cars | 1. Offsite H.W. Landfill | N.A. | | 1 | |
| | 2. Others, depending on nature of mat'l | <0 | N.A. | >2 | Small volumes in railcars probably more expensive to test than to haul away |
| V. Laboratory chemicals | 1. Offsite H.W. Landfill | N.A. | | 1 | |
| | 2. Detonation (explosives only) | N.A. | N.A. | 1 | Required |
| W. Pesticides in Crates | 1. Offsite H.W. Landfill | N.A. | | 1 | |
| | 2. Offsite incineration | <0 | | 2 | Uneconomical, no approved incinerator nearby |

Western Processing Alternatives Analysis

| Waste Type | Disposal Alternative | Approx. Cost Savings vs. Offsite Haz. Waste Landfill ($000) | Approx. Cost To Devel. Suf. Information for Implementation (as % of Cost Sav.) | Estimated Time Required for Implementation (Months) | Comments |
|---|---|---|---|---|---|
| X. Paint Waste | 1. Offsite H.W. Landfill | N.A. | | 1 | |
| | 2. Incineration | <0 | N.A. | 1 | Uneconomical, no approved incinerator nearby |
| Y. Misc. flammable fluids | 1. Offsite incineration | <0 | N.A. | 1 | Uneconomical, no approved incinerator nearby |
| | 2. Offsite H.W. Landfill | N.A. | | 1 | |
| | 3. Solidify, offsite H.W. Landfill | <0 | N.A. | 1-2 | Uneconomical, unless appropriate dry, light, hazardous solidifying agent available onsite |
| Z. Concrete Blocks | 1. Steam clean & use onsite in final closure | 10-50 | 10% | 1 | Potentially attractive, depending on closure plans |
| | 2. Offsite H.W. Landfill | N.A. | | 1 | |
| AA. Building Demolition Debris | 1. Offsite H.W. Landfill | N.A. | | 1 | |
| | 2. Incineration | <0 | 20-100% | 3 | Could be difficult to separate and clean. May not be able to find a party willing to accept them |
| | 3. Cleaning and Municipal landfill | 0-10 | | 3 | |
| | 4. Cleaning and reuse | 0-10 | | 3 | Unlikely that many of the building materials would be suitable for reuse. |
| BB. Drums | 1. Offsite H.W. Landfill, as is | N.A. | | 1 | |
| | 2. Offsite H.W. Landfill, crushed on site | 10-50 | 20% | 2 | On-site crusher probably not available; alternative crushing methods are highly labor intensive but still attractive |
| | 3. Steam clean, sell for offsite salvage/reuse | <0 | N.A. | 3 | Insides of most drums are not easily accessible, making cleaning highly labor intensive. Salvage value is minimal |
| | 4. Steam clean, haul to nonhazardous landfill | <0 | N.A. | 3 | Same problem as with alternative 3; cleaning highly labor intensive |

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